Maryland Public Health Strategy for Climate Change

Prince George's County Site Visit

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Director, Environmental Health Bureau
Prevention and Health Promotion Administration

October 11, 2013
Largo, MD

Site Visit Agenda

11:00 – 11:15 am …… ……Welcome/Introductions

11:15 – 11:30 am …… ……Overview of Climate Change Project, Site Visit Goals

11:30 am – 12:15 pm …….. ……..Discussion of Local Health Data, Priorities, Possible Contributions of DHMH Climate Change Project

12:15 – 12:30 pm …….Environmental Health Data Portal Demonstration

12:30 – 12:45 pm ……Next Steps

12:45 – 1:00 pm ……..Wrap-Up

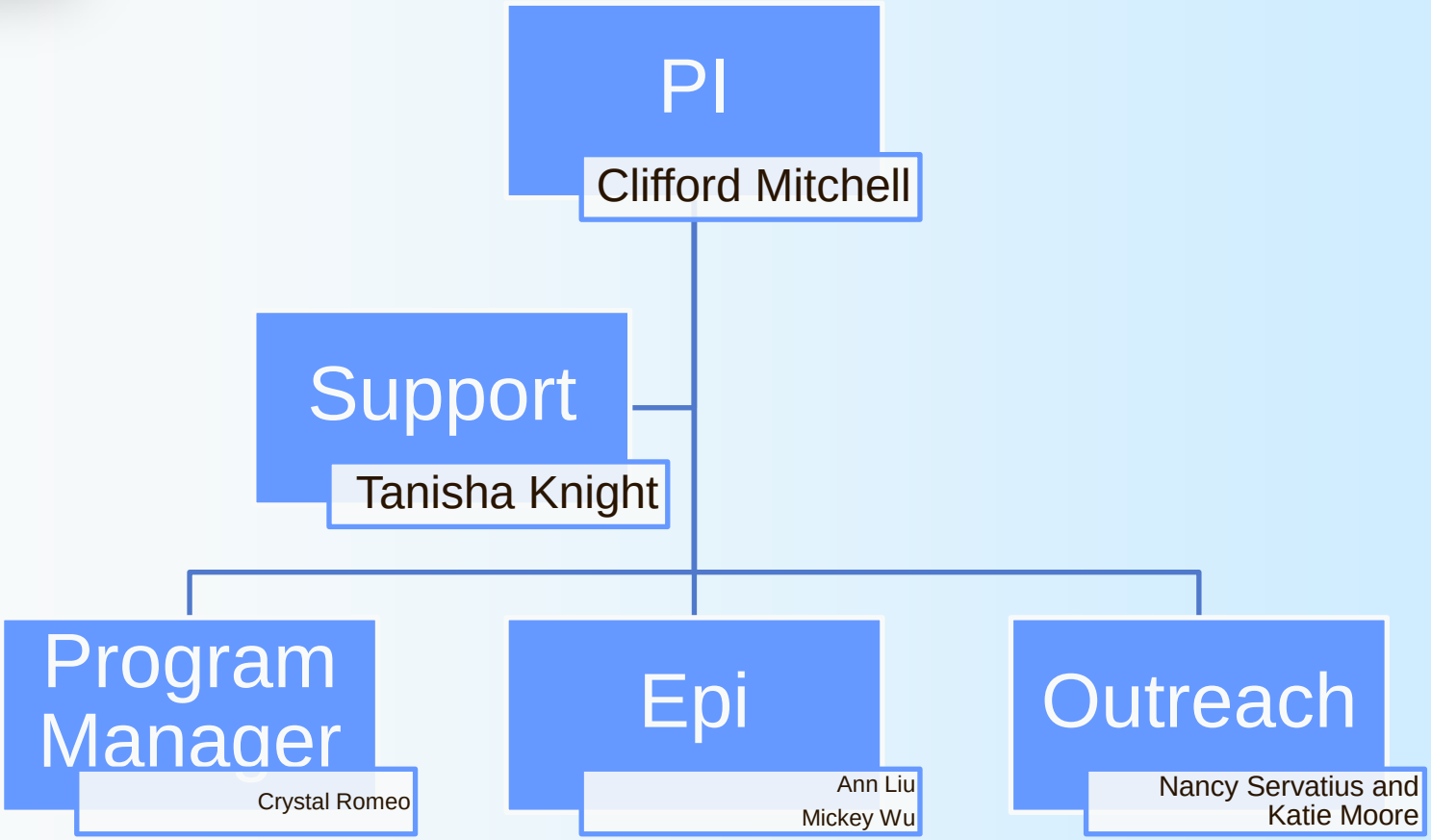
GOALS

- Review overall project
- Discuss PG County Local Health Priorities
- Discuss ways in which climate change might affect local priorities
- Identify products (forecasts, models) that might assist PGCHD in achieving its goals
- Discuss one possible regional project (asthma)

Welcome and Introductions

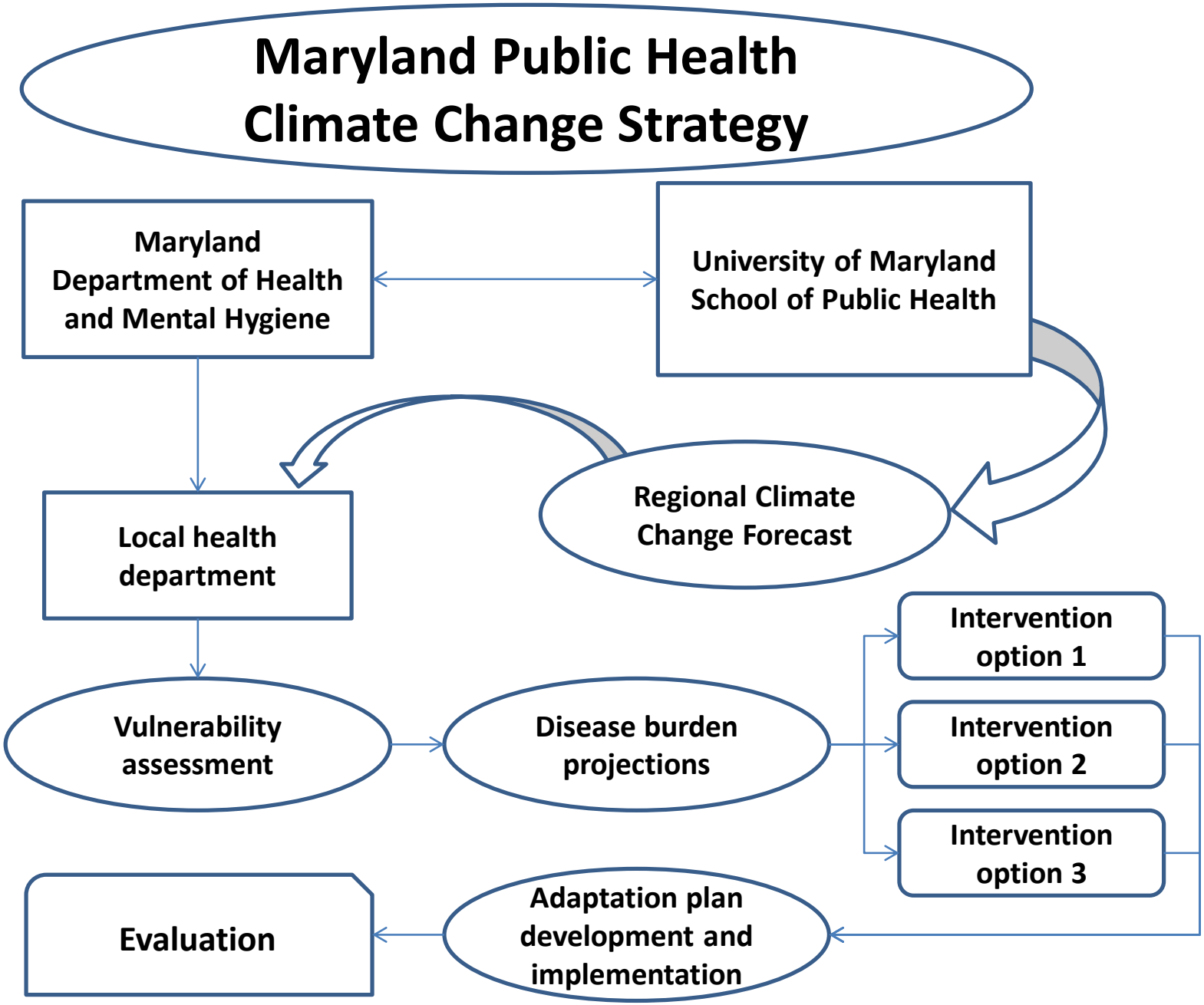
- PROJECT TEAM
  - Maryland Department of Health and Mental Hygiene
  - University of Maryland College Park
  - CDC
  - Other Partners

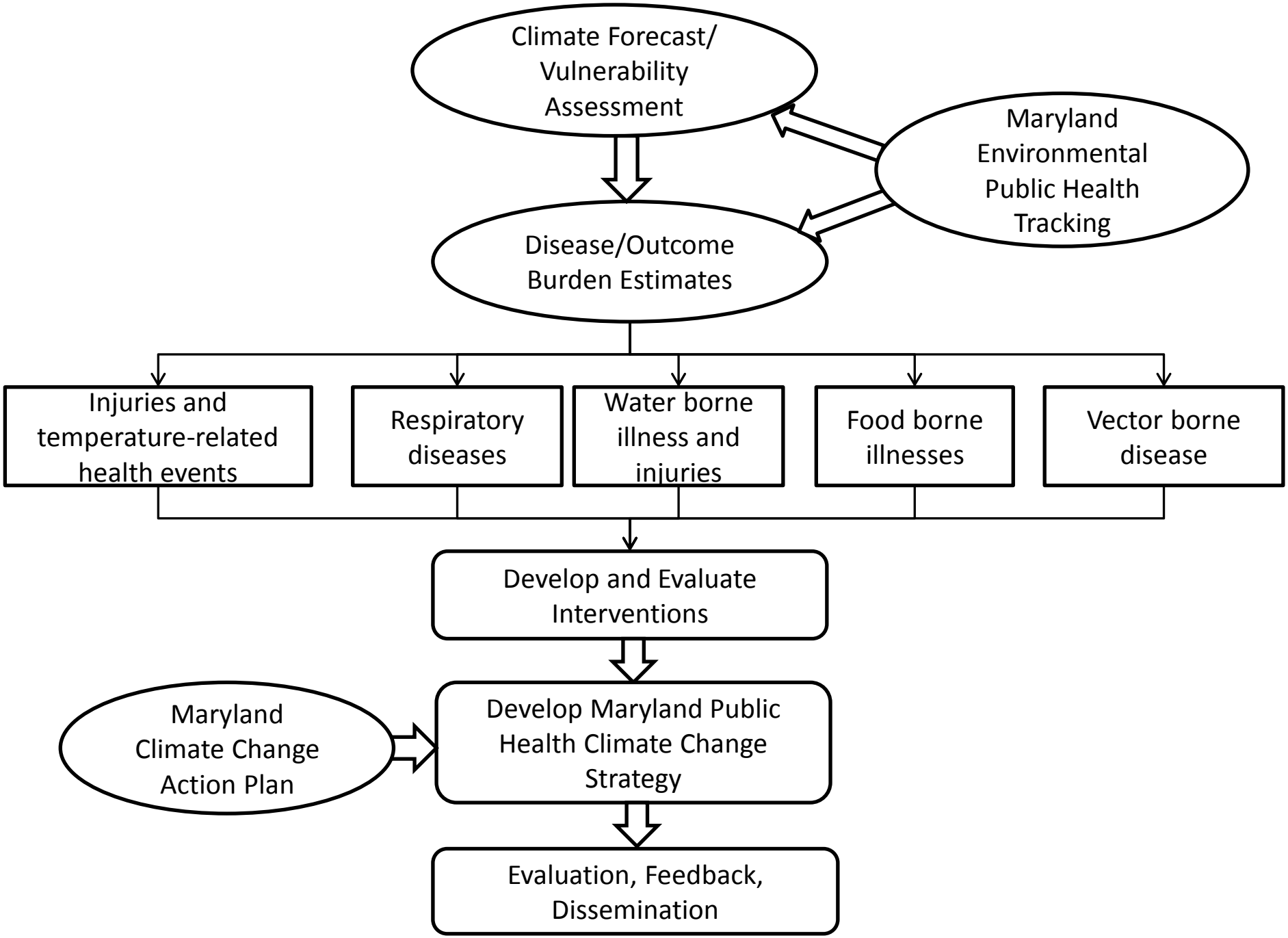
Climate Change Project



Maryland Public Health Strategy for Climate Change

- Based on CDC BRACE framework (building resistance against climate effects)
- 4 year cooperative agreement
- Also operates within context of Maryland Climate Change Action Plan


Maryland Public Health Climate Change Strategy
Maryland Department of Health and Mental Hygiene
University of Maryland School of Public Health
Regional Climate Change Forecast
Local health department
Vulnerability assessment
Disease burden projections
Intervention option 1
Intervention option 2
Intervention option 3
Adaptation plan development and implementation
Evaluation


Climate Forecast/ Vulnerability Assessment
Maryland Environmental Public Health Tracking
Disease/Outcome Burden Estimates
Injuries and temperature-related health events
Respiratory diseases
Water borne illness and injuries
Food borne illnesses
Vector borne disease
Develop and Evaluate Interventions
Maryland Climate Change Action Plan
Develop Maryland Public Health Climate Change Strategy
Evaluation, Feedback, Dissemination

Goals	Objectives	Timeline	Performance Metric(s)
1. Prepare a Climate Forecast and Vulnerability Assessment	1.1 Prepare climate forecast	9/1/2012 – 8/31/2013	Forecast products for selected regional, local jurisdictions
	1.2 Vulnerability assessment	11/1/2012 – 8/31/2013	Mapping of vulnerable populations, quantitative vulnerability assessment
2. Project Disease/ Outcome Burden	2.1 Injuries and Temperature-Related Health Events	9/1/2013 – 3/31/2014	Metrics for each selected disease or outcome
	2.2 Respiratory Diseases		
	2.3 Water Borne Illness		
	2.4 Food Borne Illness		
	2.5 Vector Borne Disease		
3. Develop and Evaluate Public Health Interventions	3.1 Develop interventions	1/1/2014 – 8/31/2014	Detailed written description of interventions
	3.2 Assessment of public health interventions using health impact assessment framework	3/1/2014 – 2/28/2015	Formal health impact assessment of strategies/ interventions
4. Develop Maryland Public Health Climate Strategy	4.1 Develop written strategy document within Maryland Climate Change Action Plan framework	3/1/2015 – 8/31/2015	Strategy document
	4.2 Obtain feedback from key stakeholders	9/1/2015 – 2/29/2016	Written feedback incorporated in strategy document
	4.3 Adopt and promulgate strategy	3/1/2016 – 8/31/2016	Promulgation on DHMH website, other media
5. Evaluation of Maryland Public Health Climate Change Strategy	5.1 Develop evaluation framework using common evaluation tools and framework	9/1/2014 – 8/31/2016	Evaluation using criteria adopted by DHMH, Maryland Climate Change Commission

Local Public Health Department Mini-grants

- Enable public health professionals in local health departments (LHDs) to utilize climate forecast projections
- Help LHDs implement climate mitigation and/or adaptation strategies necessary to protect public health
- Evaluate the mitigation and/or adaptation strategy used to determine the quality of improvement and to incorporate refined inputs

Local Public Health Department Projects

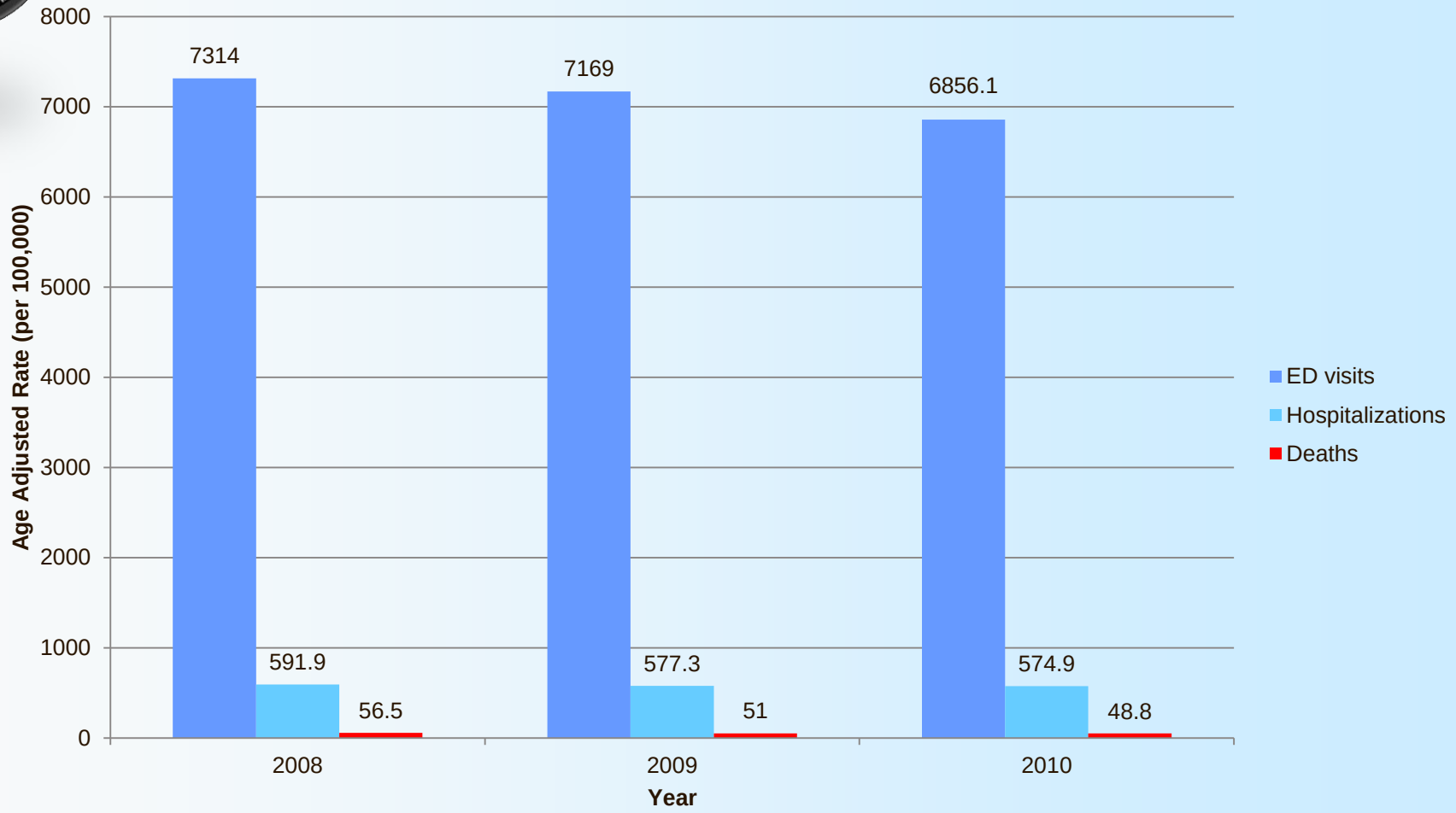
- Proposals developing in Fall, 2013
  - Baltimore City
  - Prince Georges County
  - Washington County
  - Wicomico County

Health Statistics (Prince George's County)

Provided by
Ann Liu, PhD, MPH
Mickey Wu, MPH
Elizabeth Young, MPH

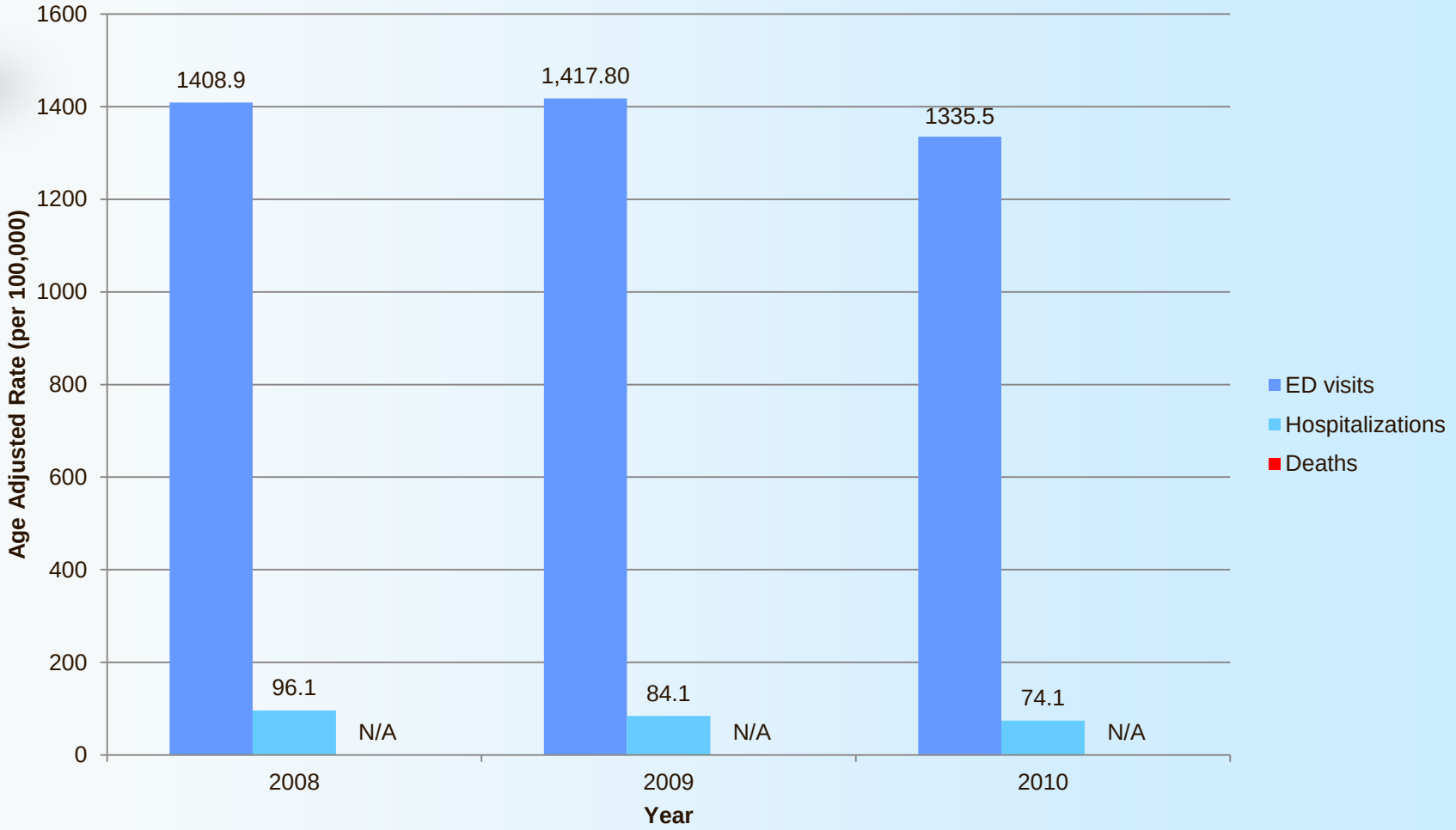
PRELIMINARY BASELINE HEALTH STATISTICS

Total Injury Rates



Data source: Injuries in Maryland: Statistics on Injury-related Emergency Department Visits, Hospitalizations, and Deaths Report (years 2008-2010*)
Age-adjusted rates of total injuries (per 100,000 population)
*Data by jurisdiction not available until 2008; report not available for 2011

Motor Vehicle Injuries



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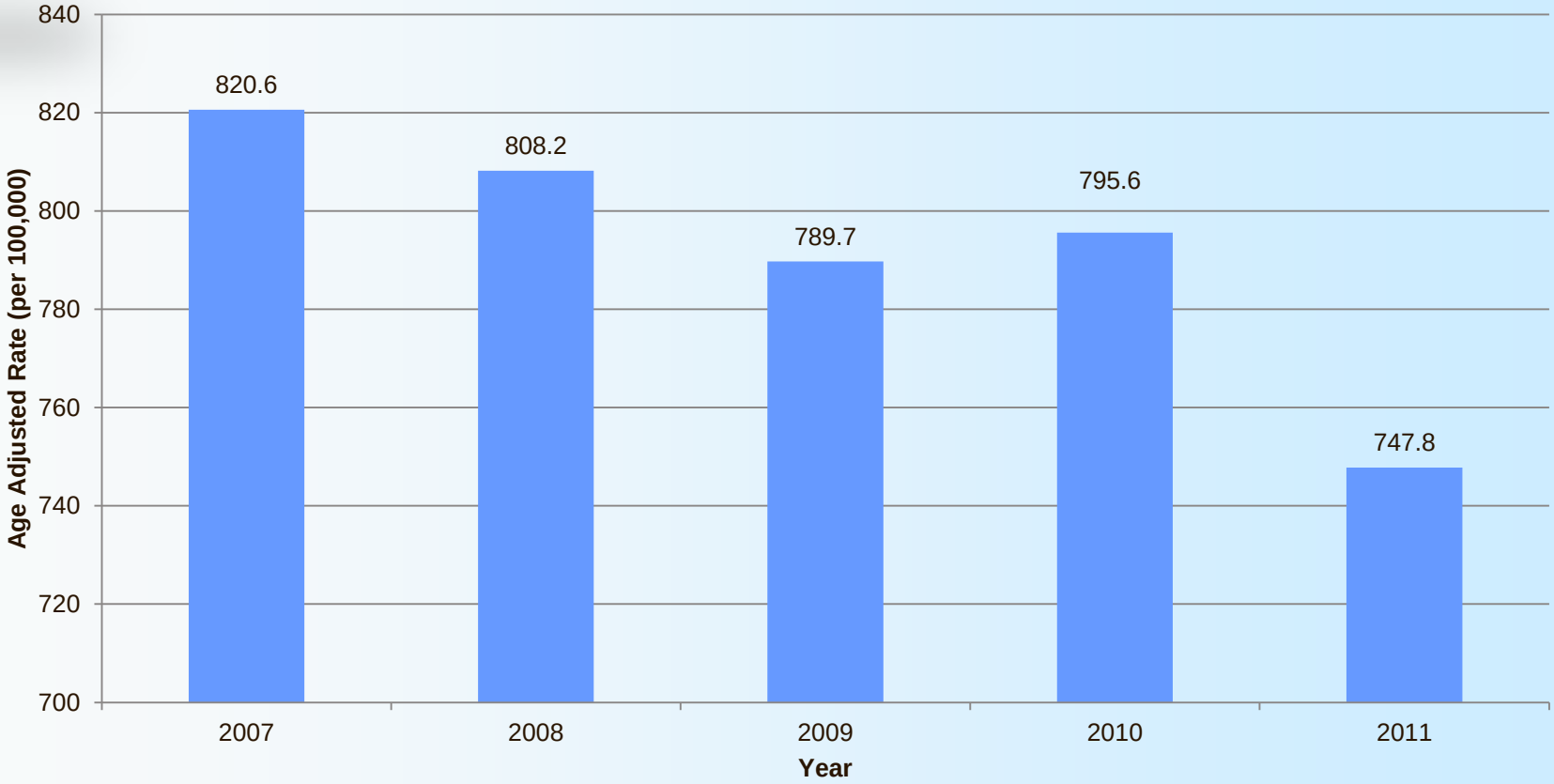
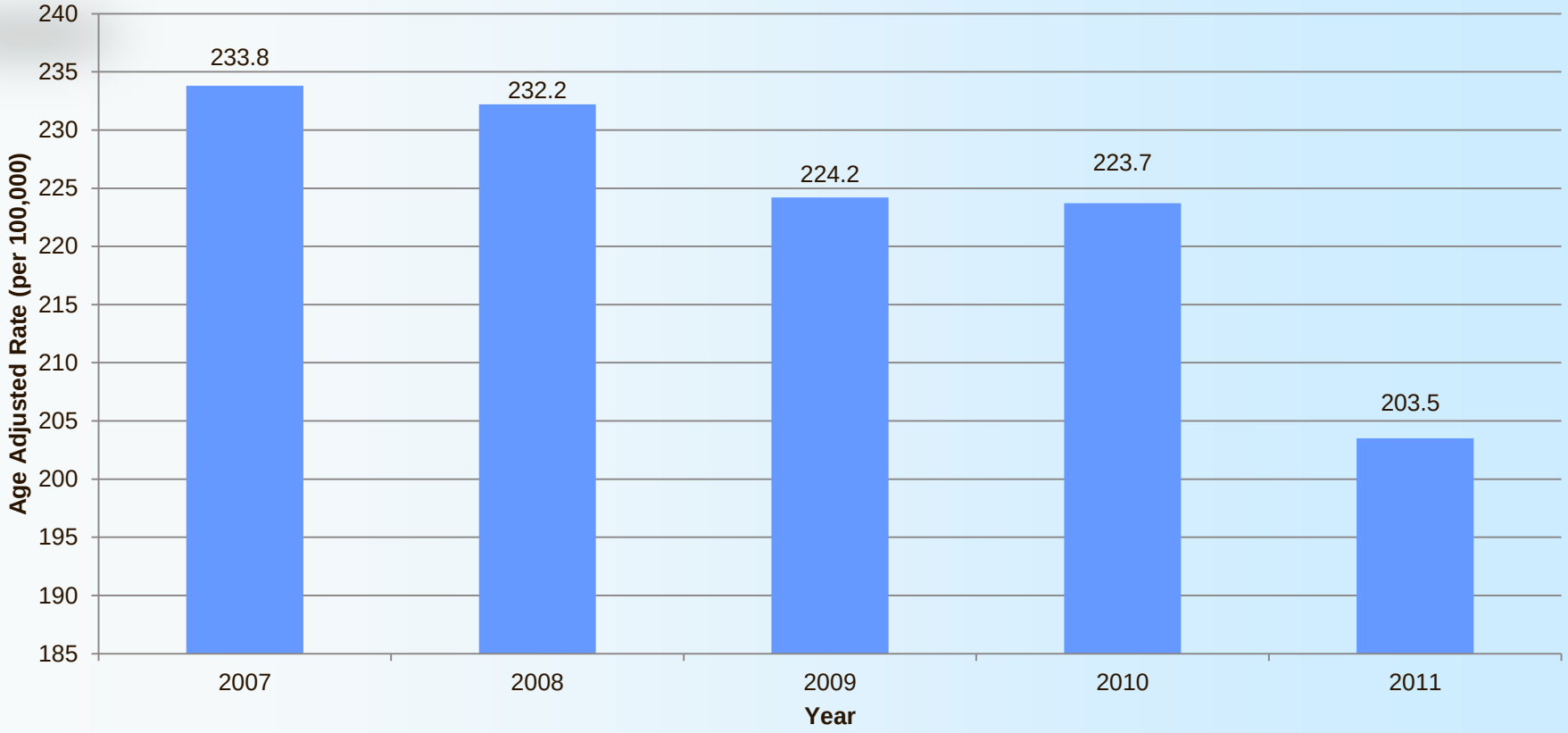
Age Adjusted All-Cause Mortality Rates



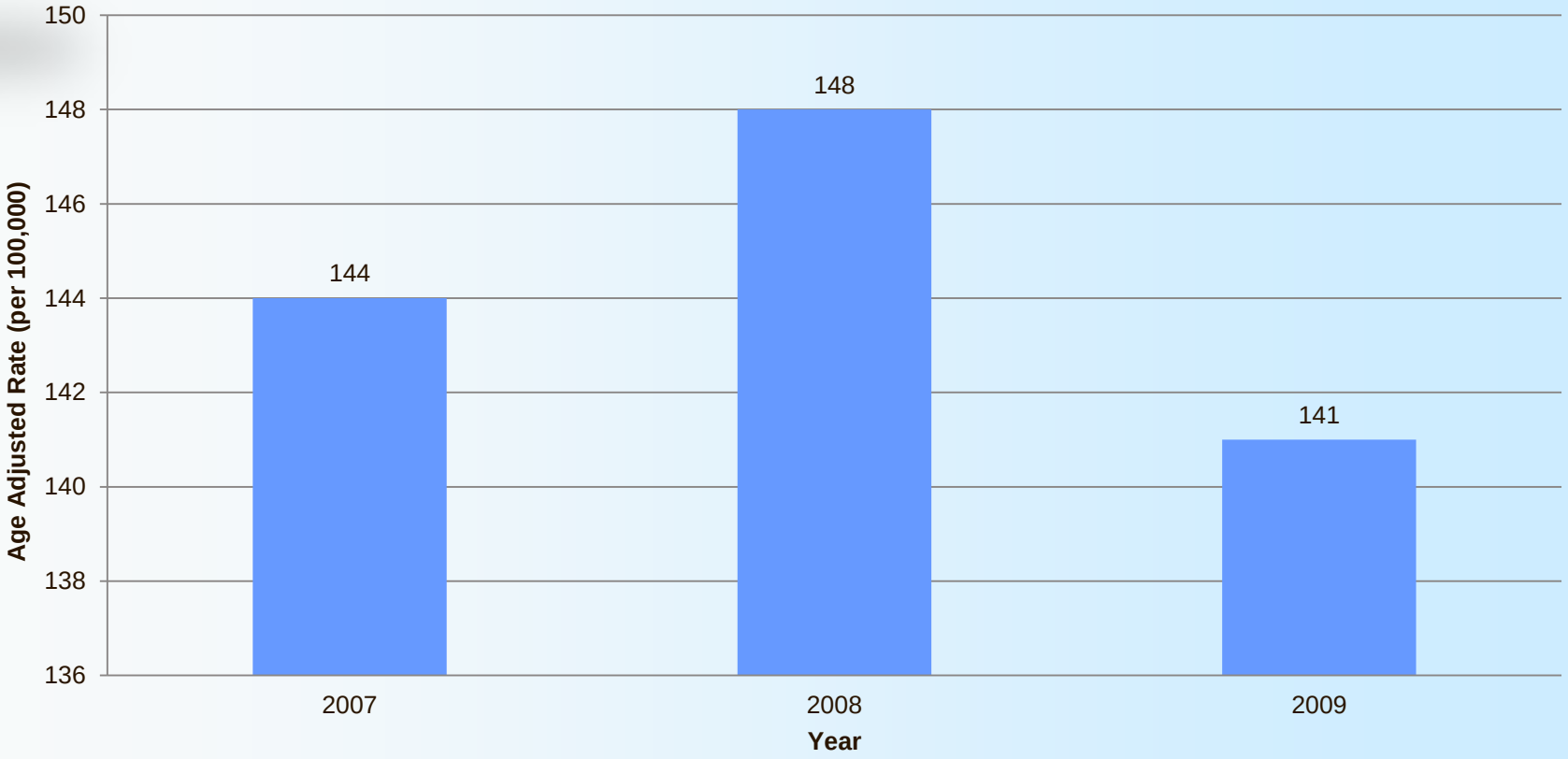
Data source: Maryland Vital Statistics Annual Report (years 2007-2011)
Rates of all-cause mortality (per 100,000 population)

Age Adjusted Mortality from Diseases of the Heart



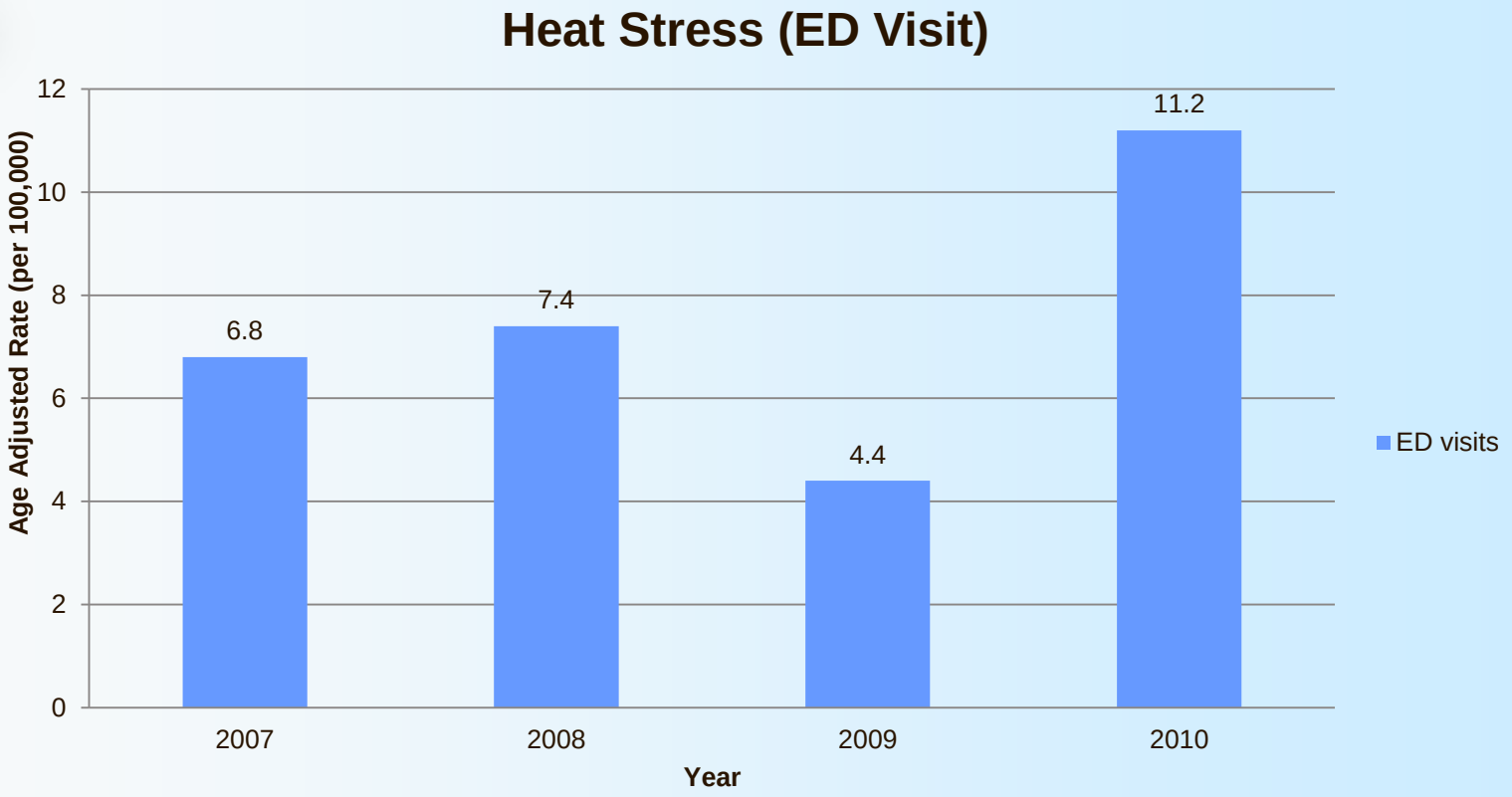
Data source: Maryland Vital Statistics Annual Report (years 2007-2011)
Rates of all-cause mortality (per 100,000 population)

Acute MI for Prince George's County (ED Visits)



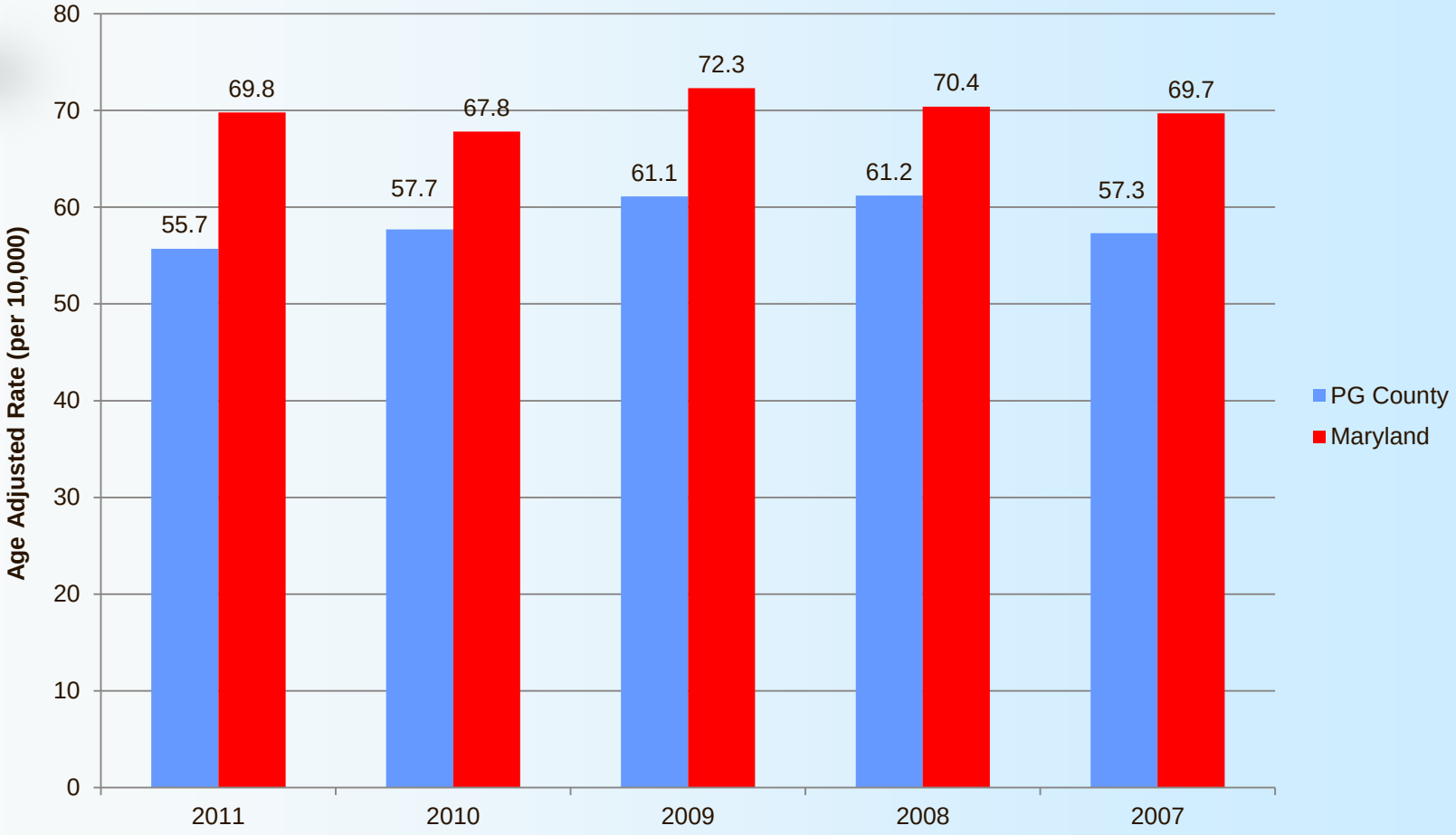
Data source: ED visits of Acute MI from DHMH EPHT: Infectious Disease and Environmental Health Administration (years 2007-2009)
http://eh.dhmh.md.gov/idehaweb/query.aspx
All rates are age-adjusted rate per 100,000 population

Heat Stress for Prince George's County



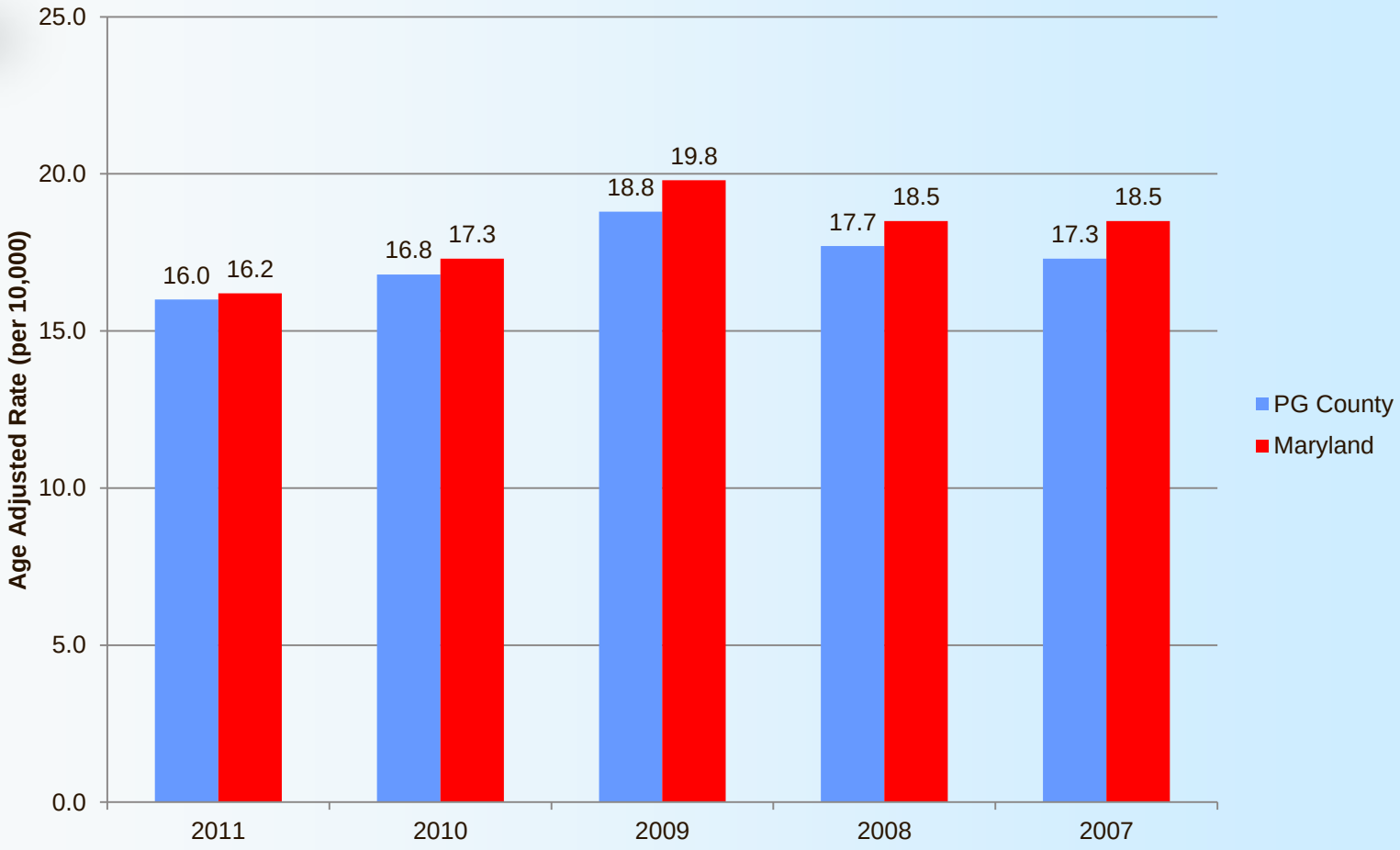
Data source: DHMH Environmental Public Health Tracking: Heat Stress Indicator
Age-adjusted rates of heat stress (per 100,000 population)

Asthma Emergency Department (ED) Visits



Hospitalization rates include Maryland residents hospitalized in Maryland, Washington, D.C. and Pennsylvania.
All rates per 10,000 population and are age-adjusted to the 2000 U.S. Standard Population as published by NCHS

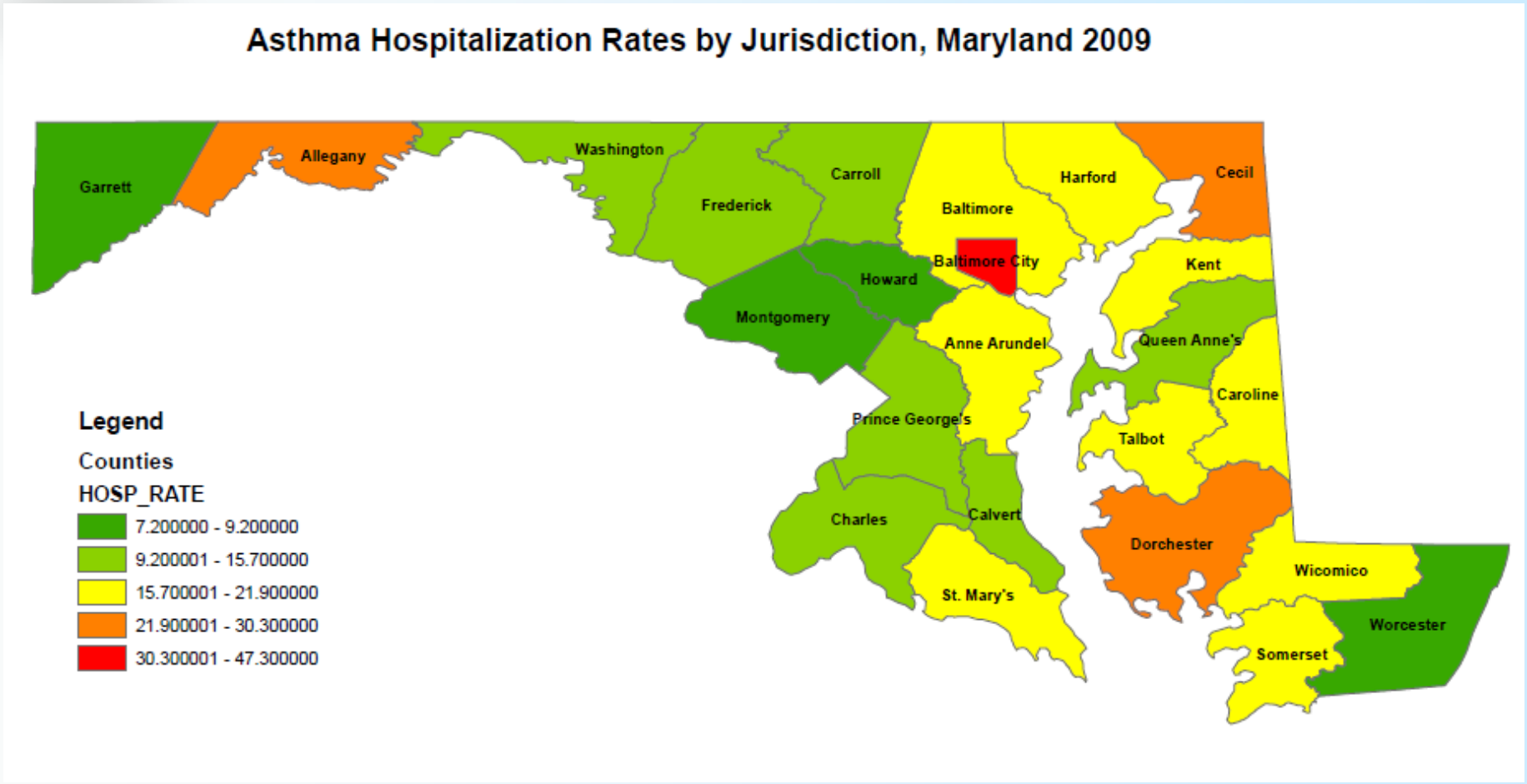
Asthma Hospitalizations



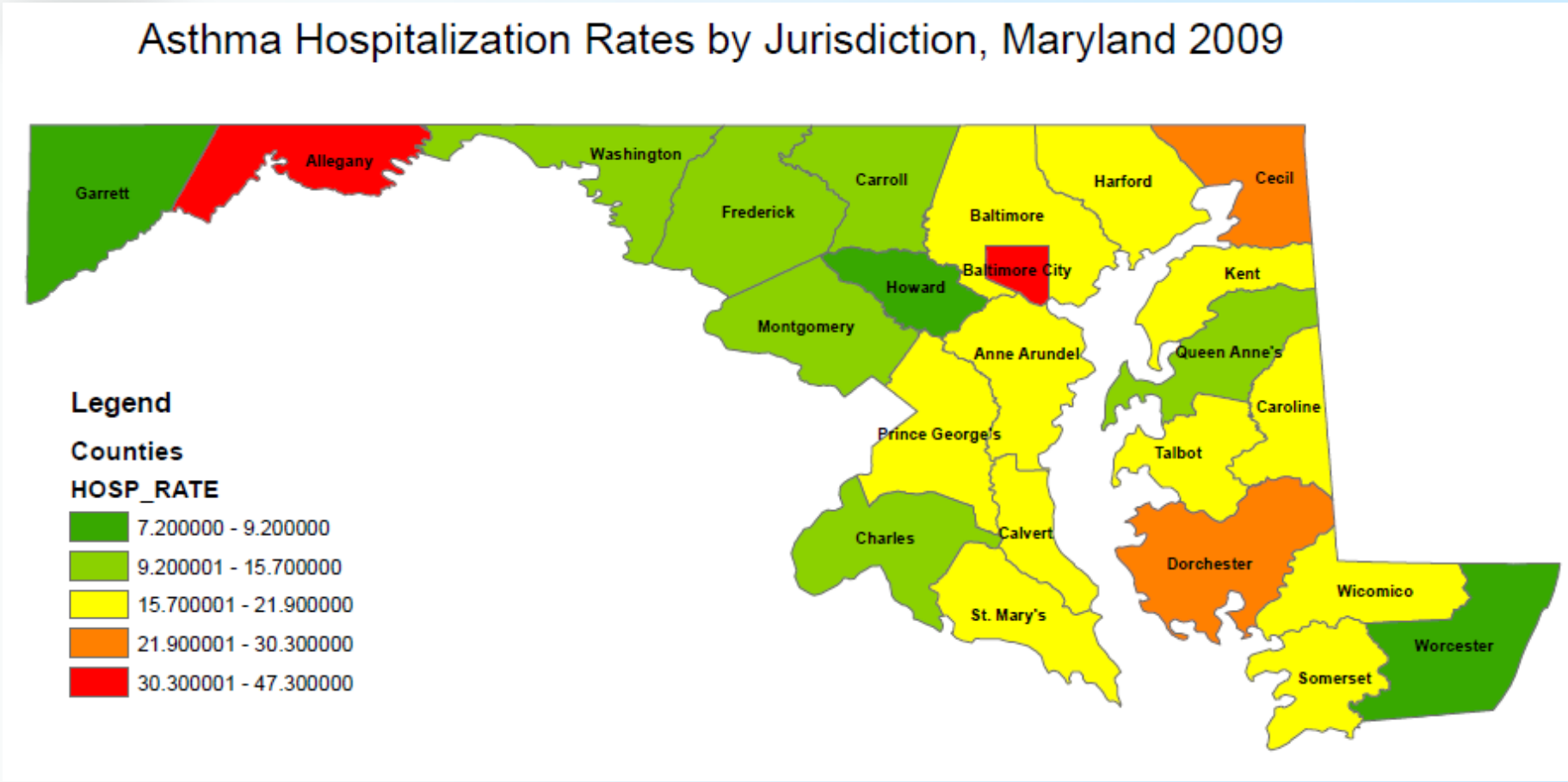
Epidemiological Methods Applied for MACP

- Inpatient hospitalization rates include out-of-state data (in addition to MD data) to get a clearer picture of Asthma in MD
- Out-of-state data includes:
  - Washington, D.C. (DC)
  - Pennsylvania (PA)
  - Delaware (DE)
  - West Virginia (WV)

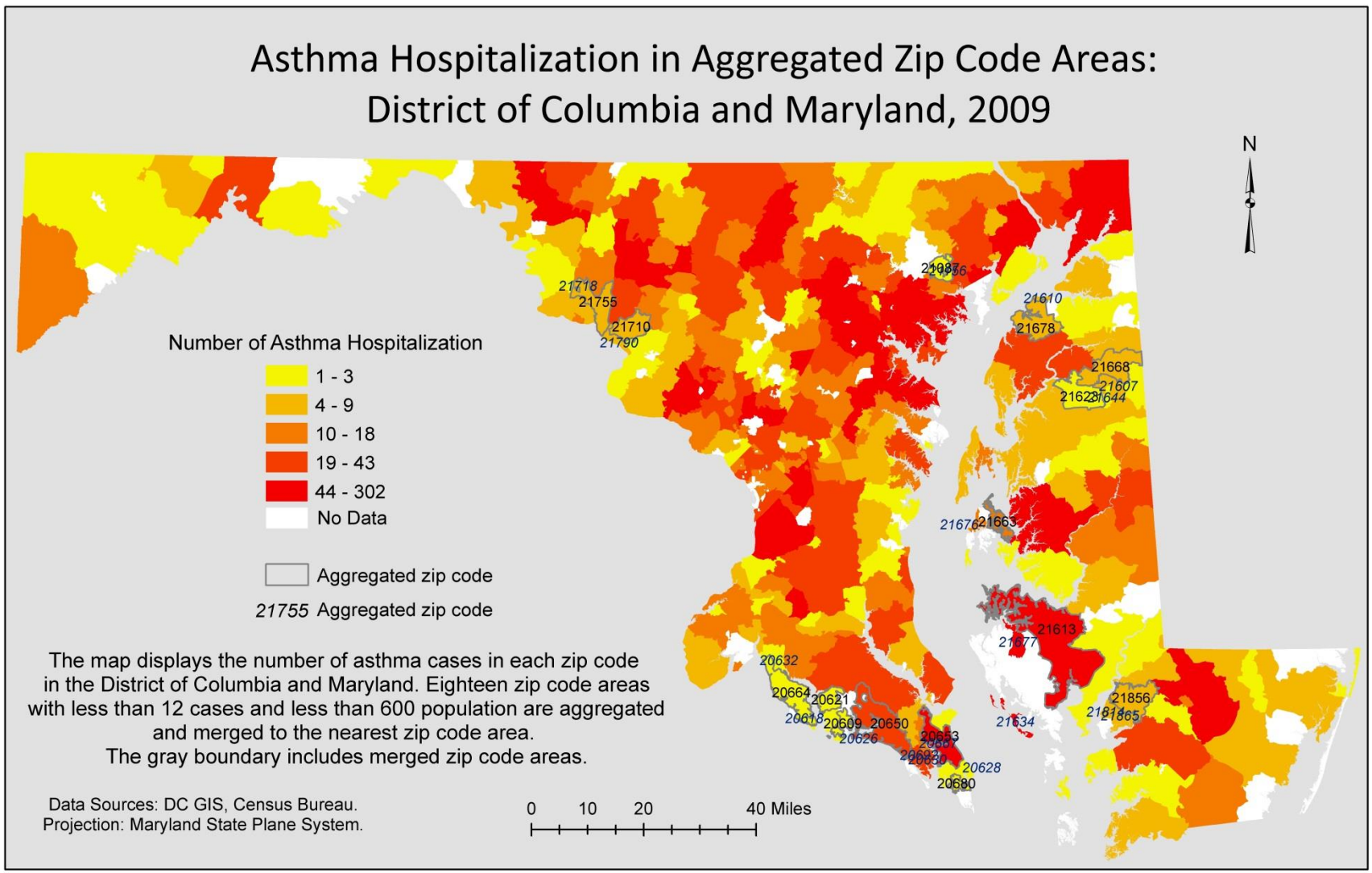
Maryland Asthma Rates (*Excluding* Out-of-State Data)



Maryland Asthma Rates (*Including* Out-of-State Data)



EPHT Asthma Data

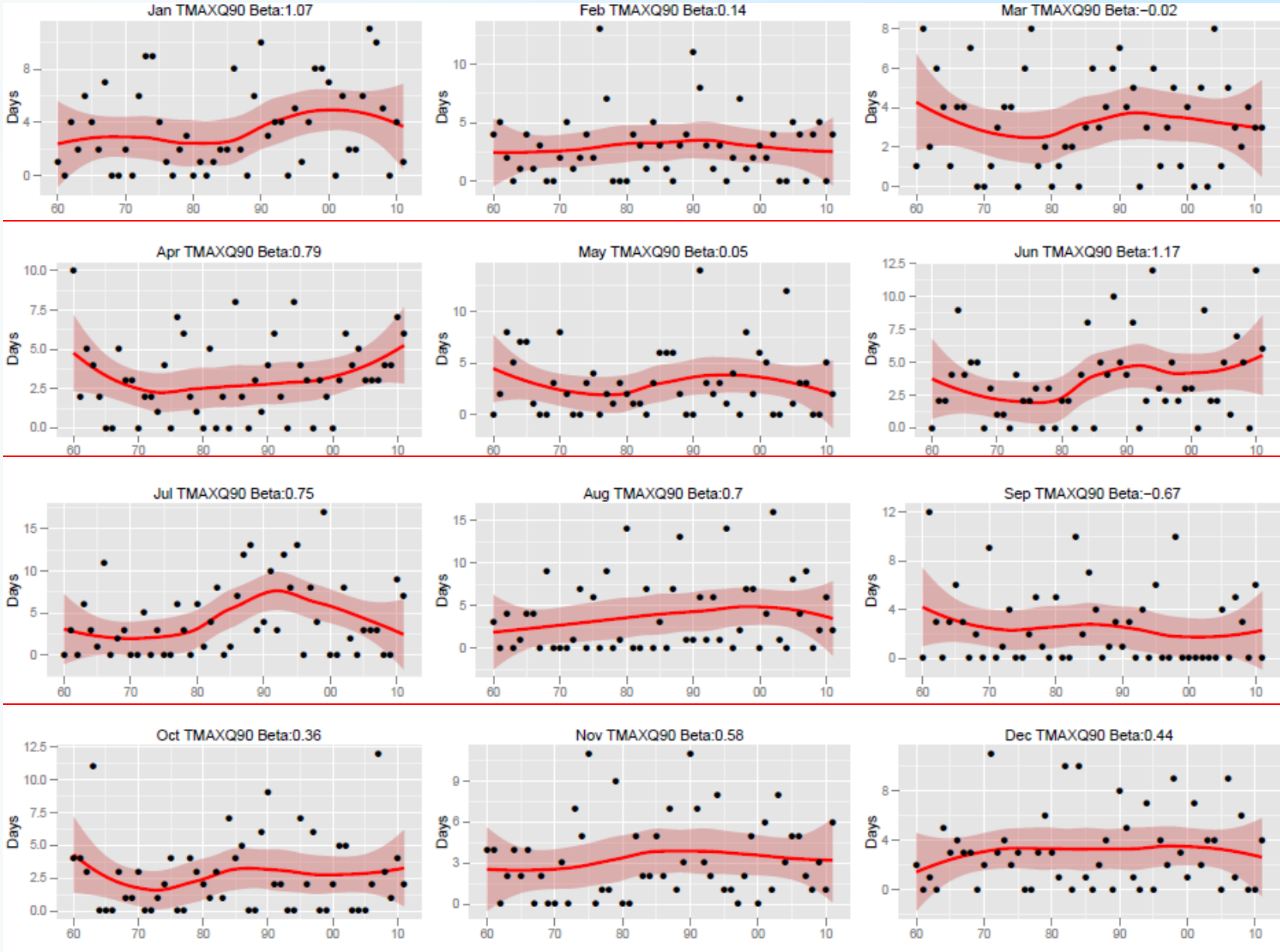


Climate Change Projections (Prince George's County)

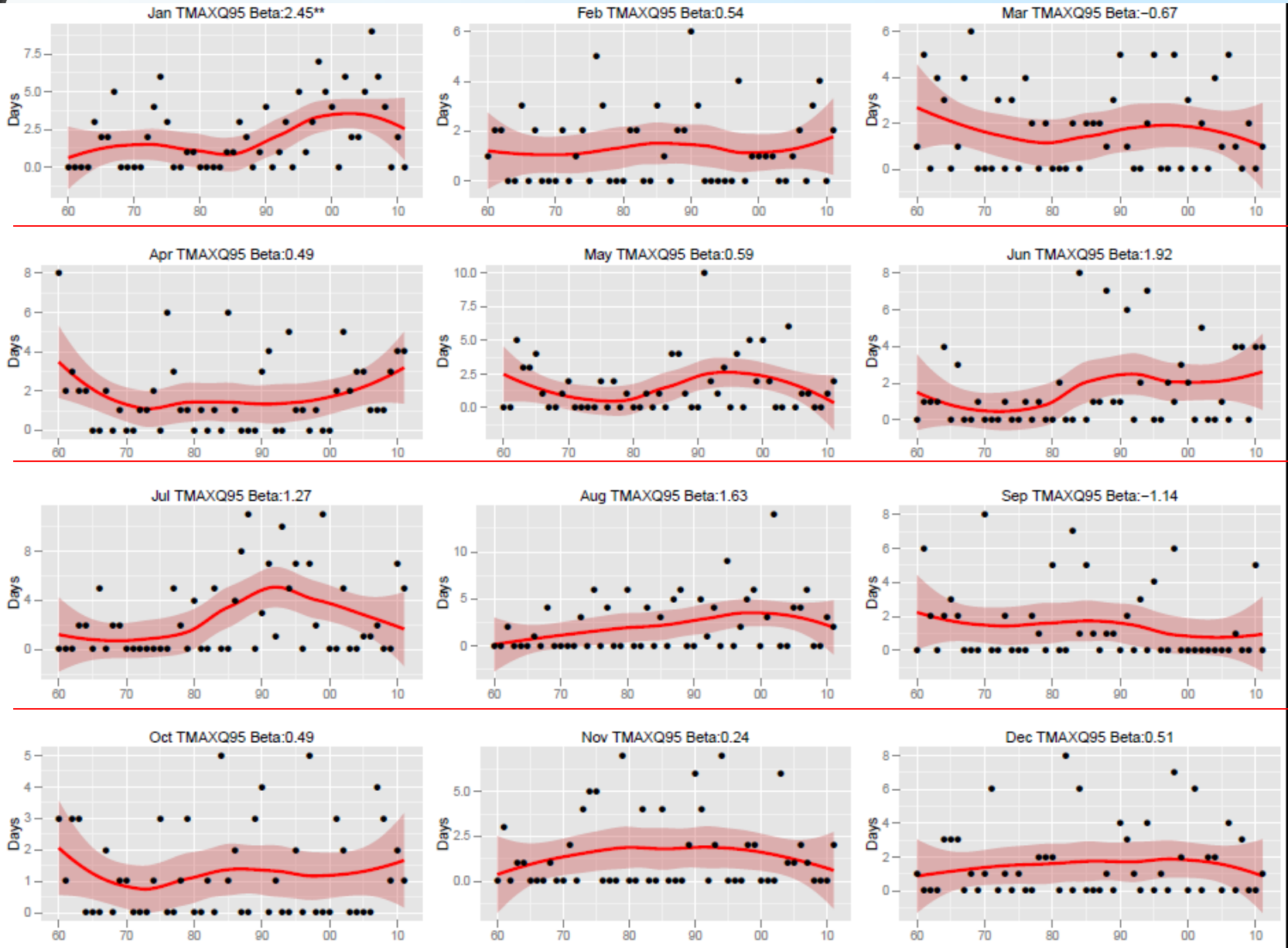
Provided by University of Maryland School of Public Health
Amir Sapkota, PhD
Chengsheng Jiang, PhD

EXCESSIVE HOT DAYS

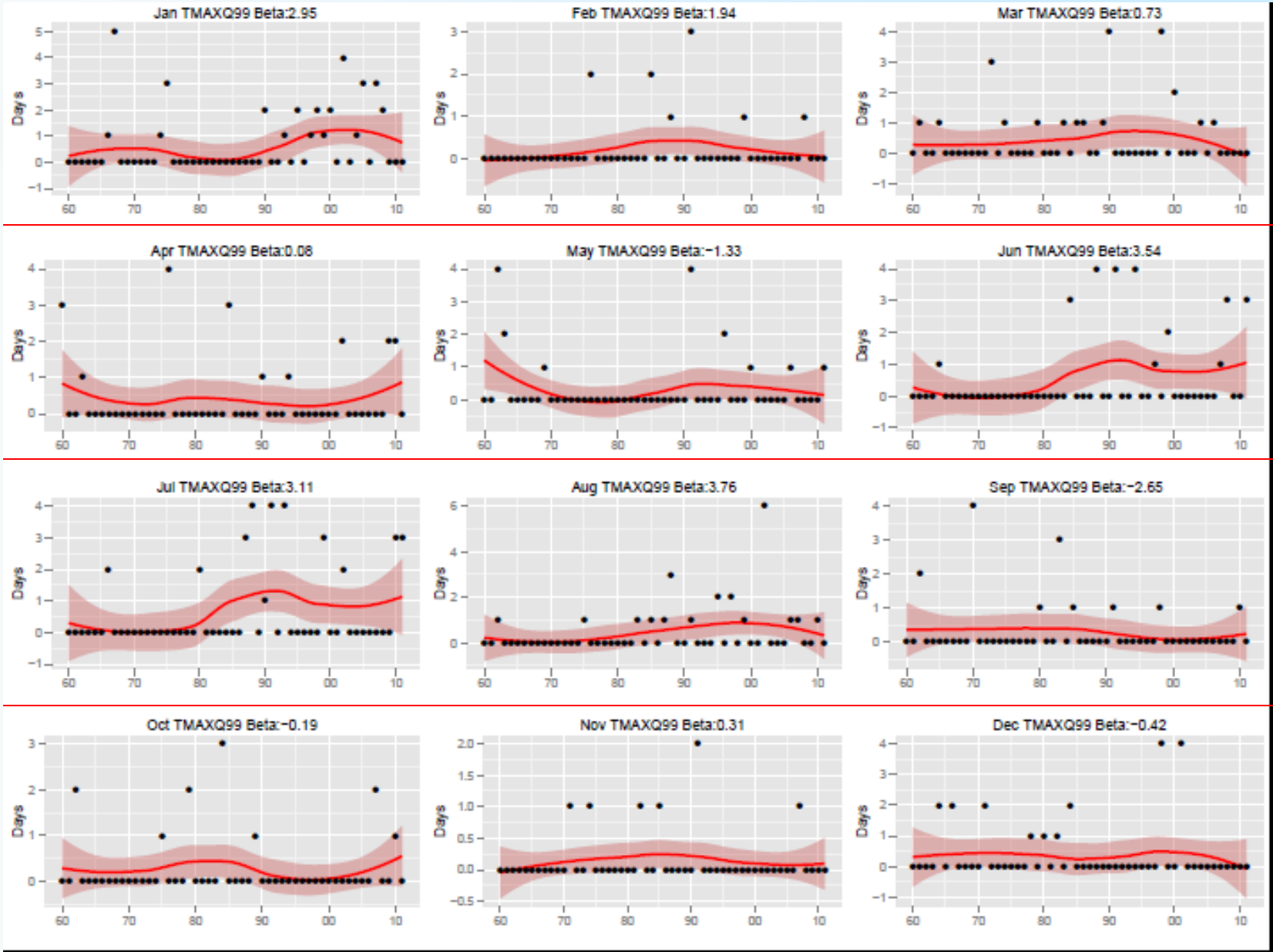
Monthly Exceedance Days (TMX90)



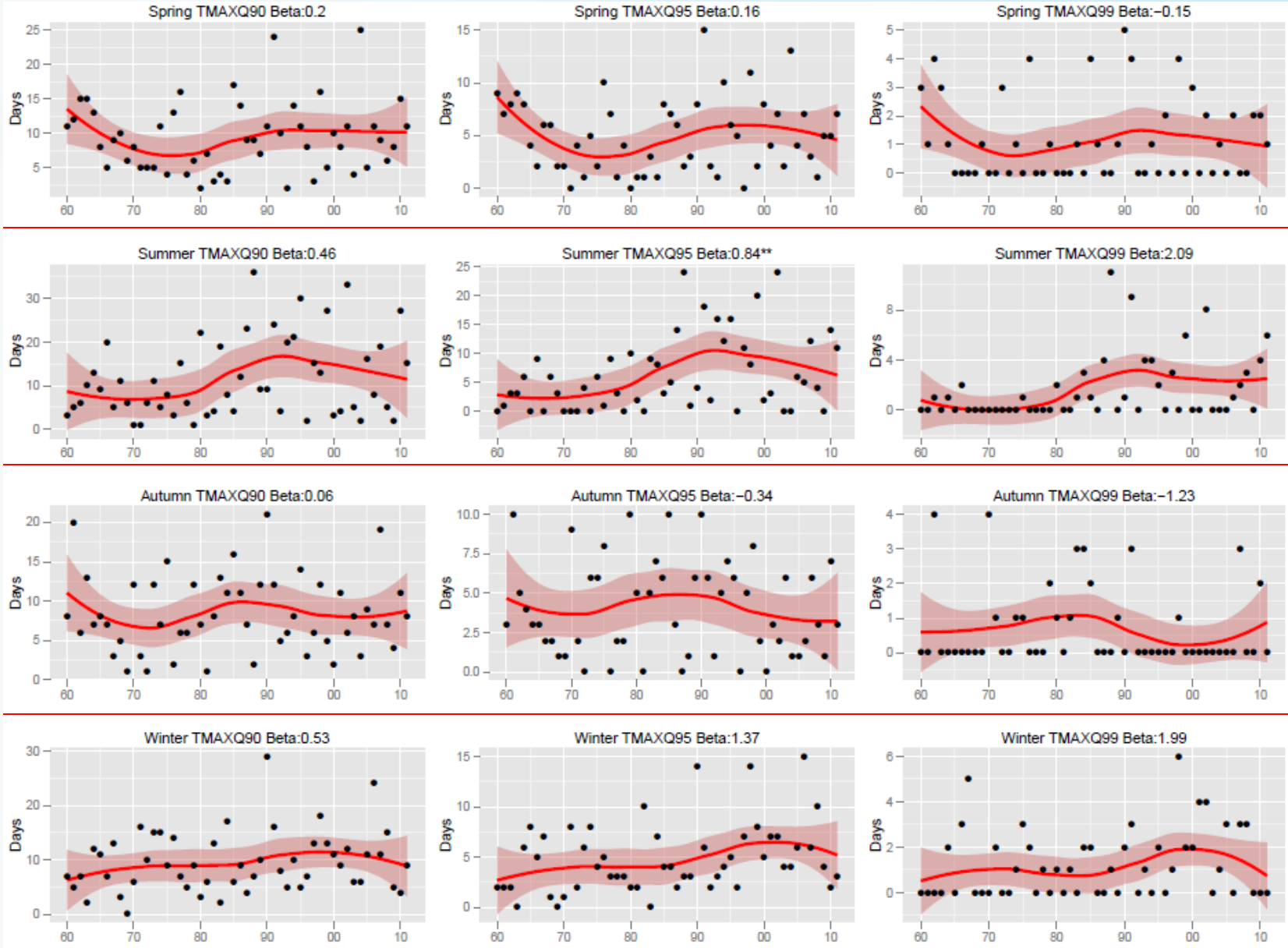
Monthly Exccedance Days (TMX95)



Monthly Exceedance Days (TMX99)

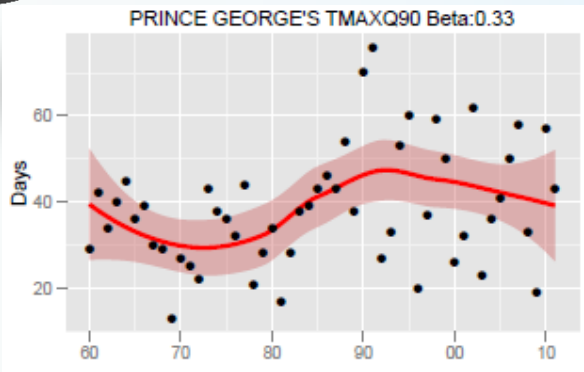


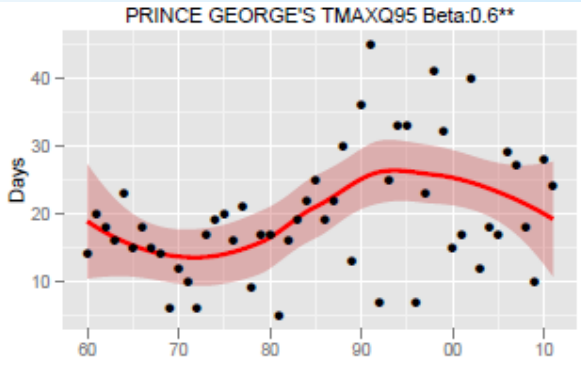
Season Exceedance Days (TMX90)

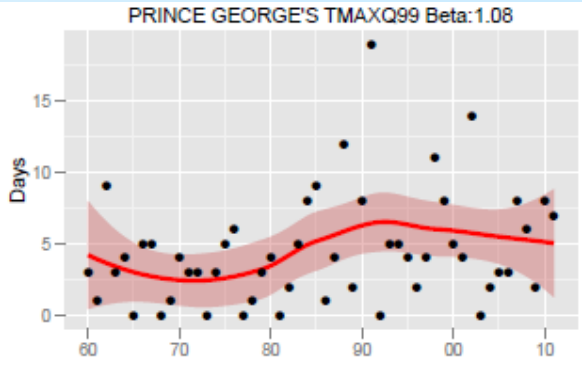


Annual Exceedance Days (TMX95)

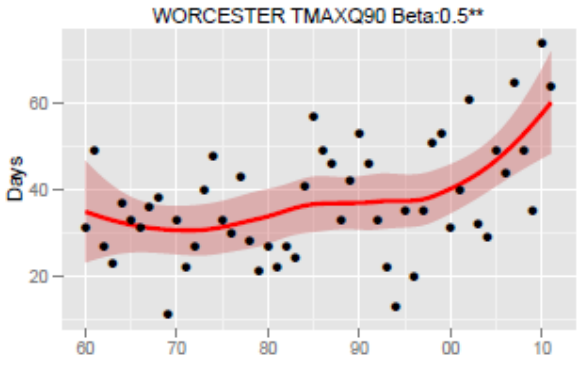
Prince Georges

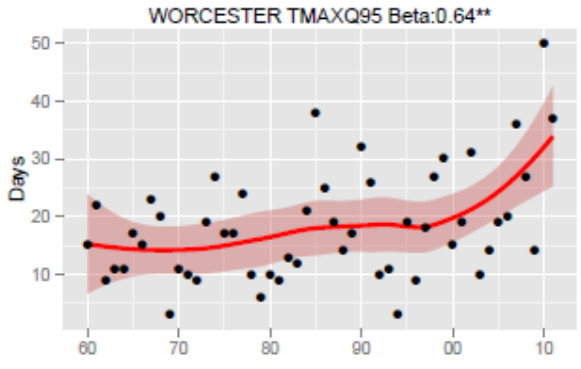


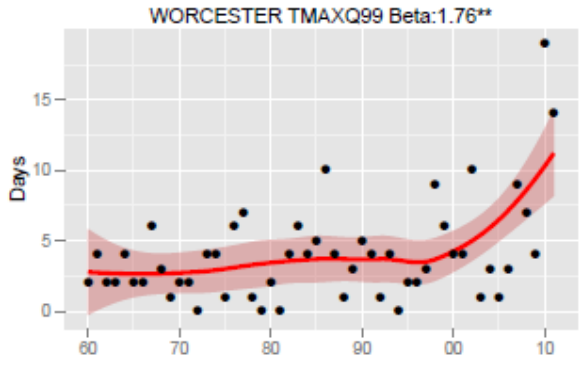




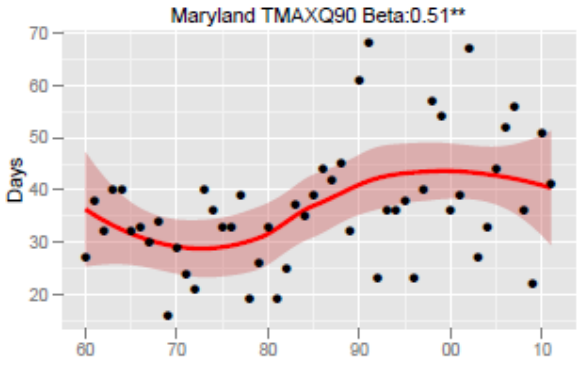
Worchester

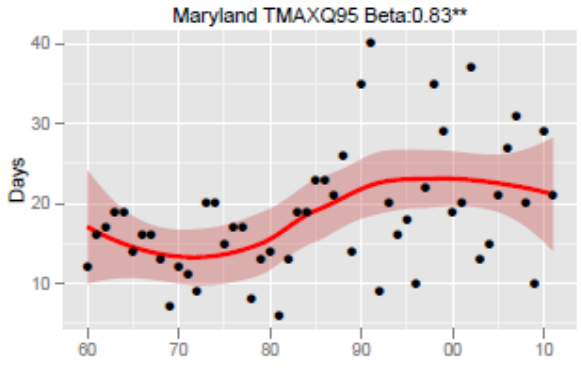


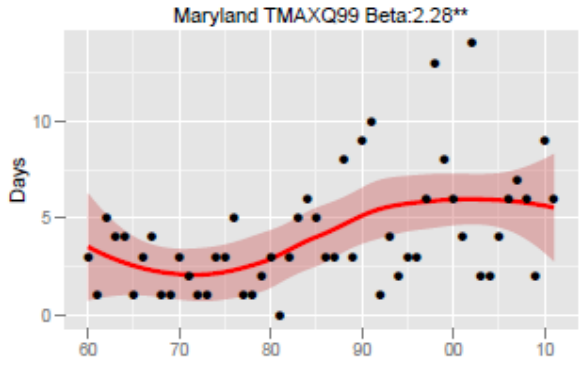




Maryland







Provided by Environmental Public Health Tracking (EPHT)
John Braggio, PhD, MPH
Mickey Wu, MPH

POLLEN INDICATOR

Pollen Indicator Overview

- CSTE/SEHIC Climate Change Indicator for Pollen (Jan 14, 2013)

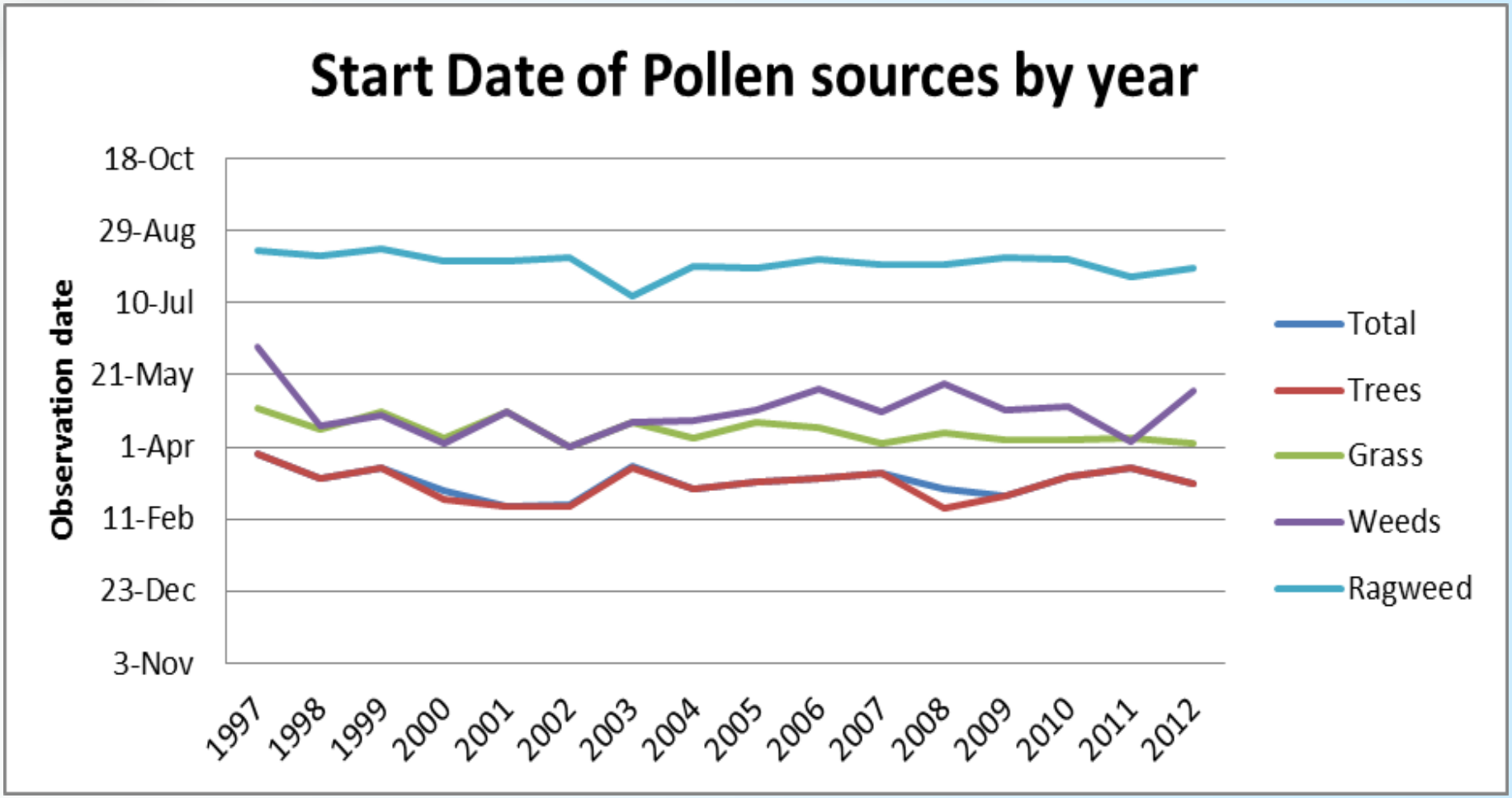
- Significance & Background
  - Pollen can adversely influence respiratory health outcomes, such as asthma
  - Future climate change pollen increases, total spores and selected spore types such as ragweed, could result in an increase in respiratory diseases

- Rationale for pollen indicator development
  - A standardized pollen indicator could be of use to both public health professionals and practitioners through the linkage of pollen with asthma and allergic rhinitis

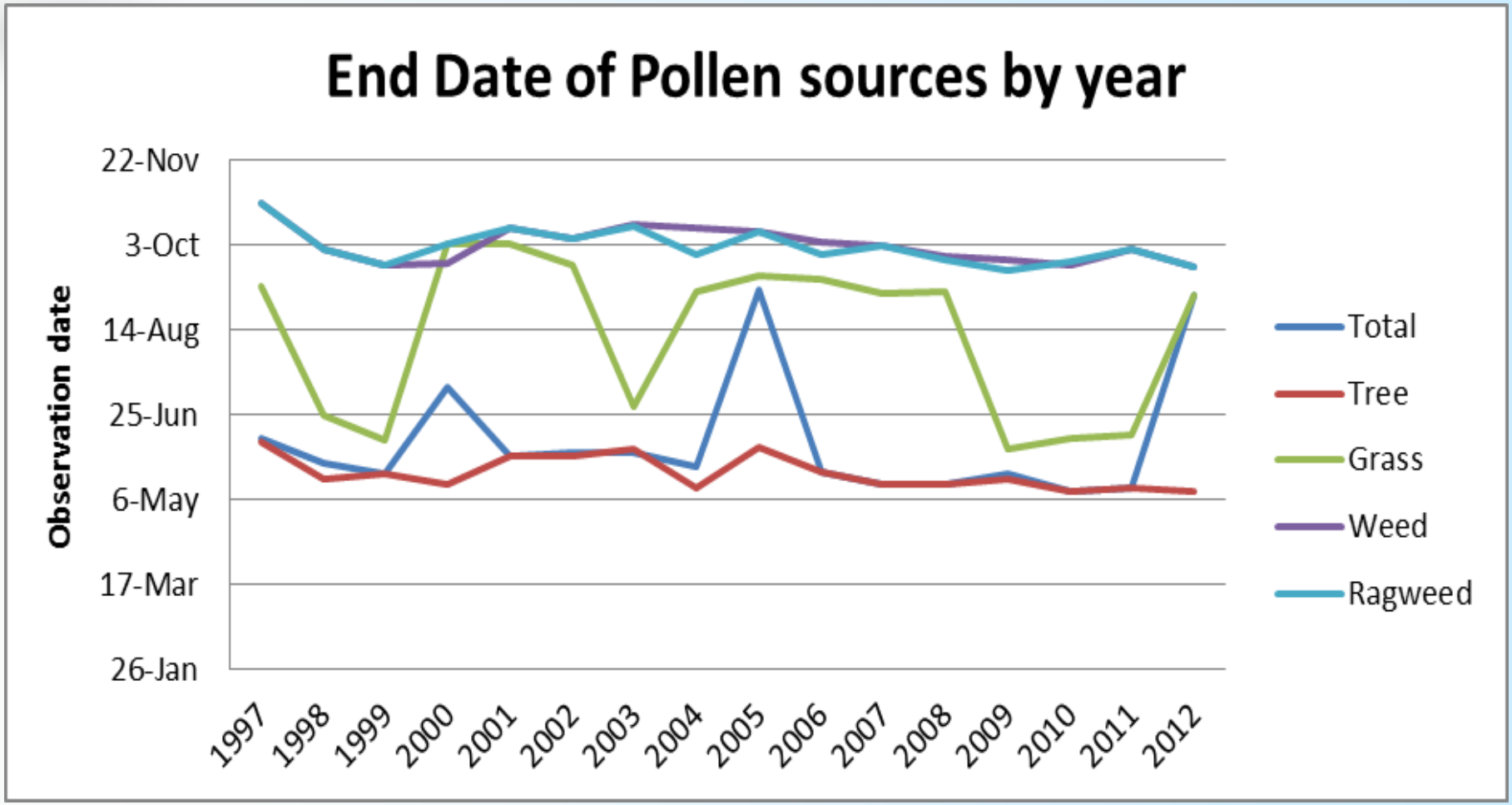
Pollen Indicator Overview, Cont.

- Measure(s)
  1. Date when the pollen season started, by pollen source (i.e., trees, grass, weeds) in a calendar year
  2. Date when the pollen season ended, by pollen source, in a calendar year
  3. Length of pollen season, in days, by pollen source, in a calendar year (#2-#1)
  4. Number and percent of days during the pollen season when pollen readings were categorically elevated (NAB categories of high or very high), by pollen source, in a calendar year
  5. Mean, minimum and maximum daily pollen counts for the pollen season, by pollen source, in a calendar year
  6. Pollen types (species) measured in a calendar year

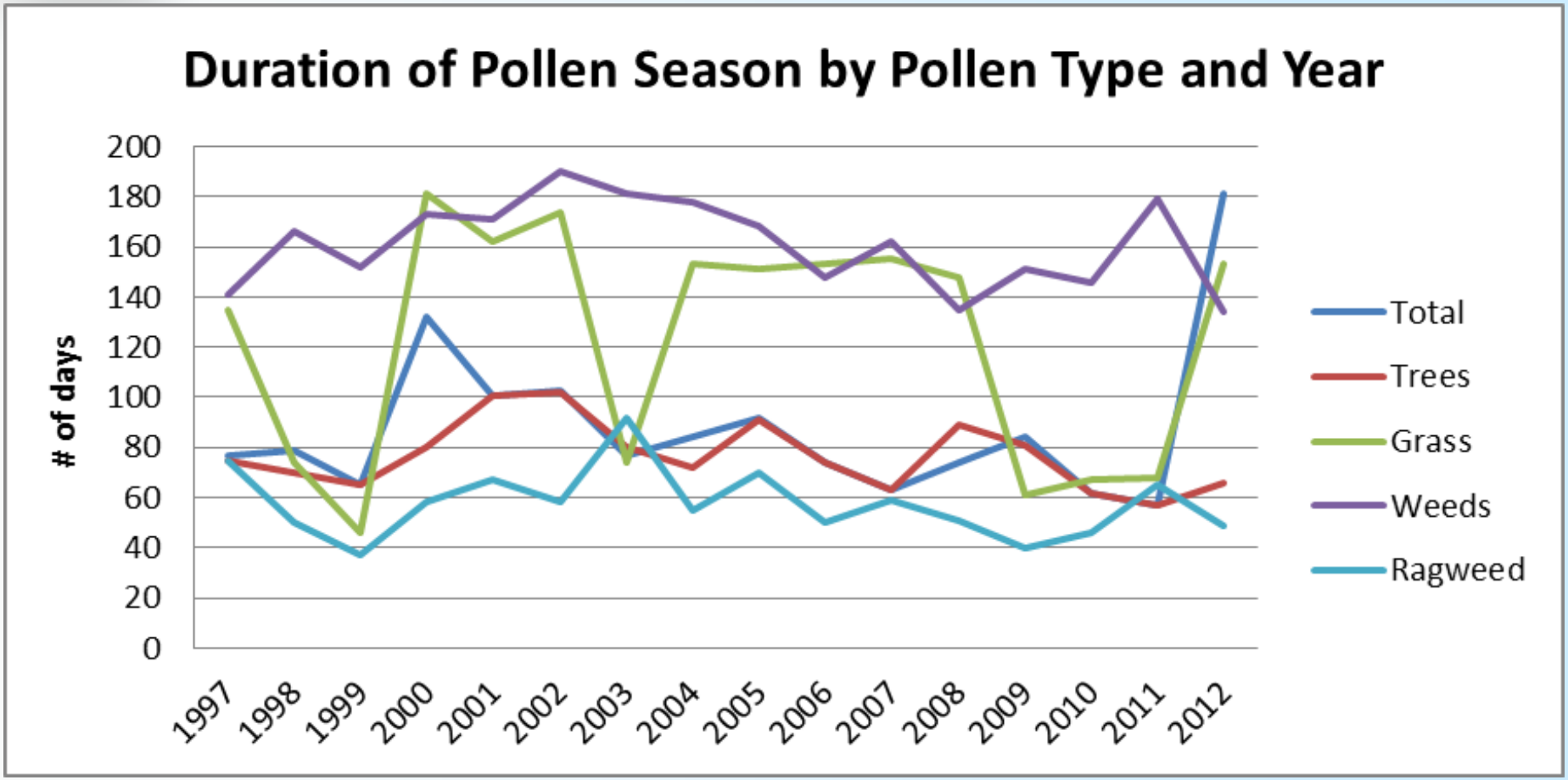
Start of Pollen Season



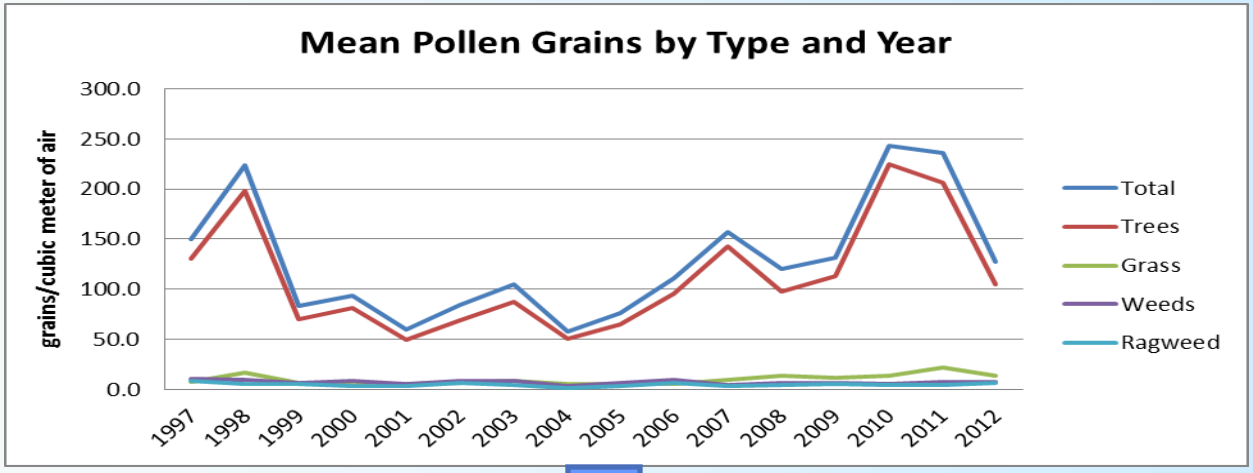
End of Pollen Season

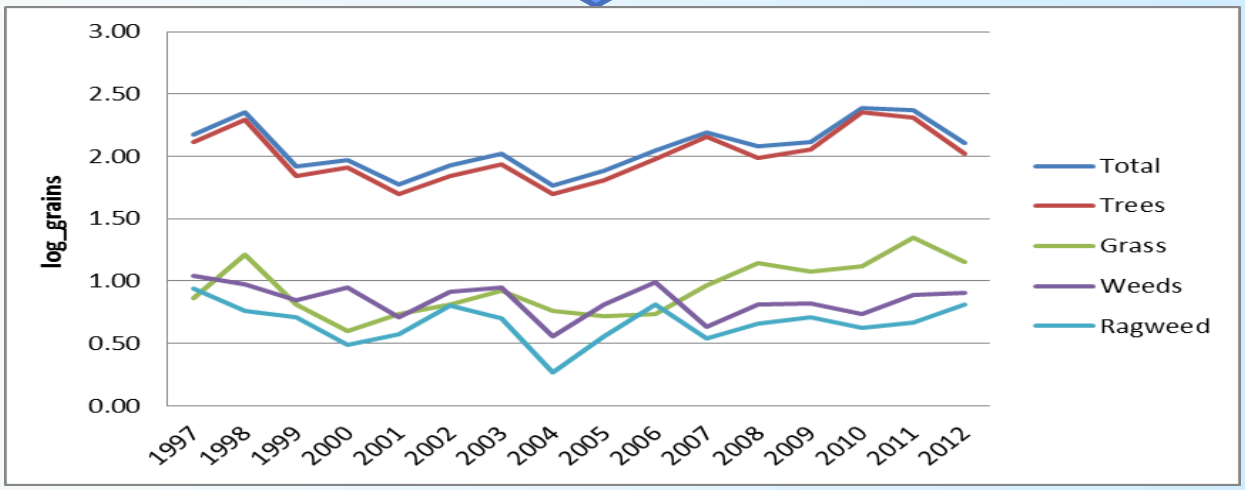


Length of Pollen Season

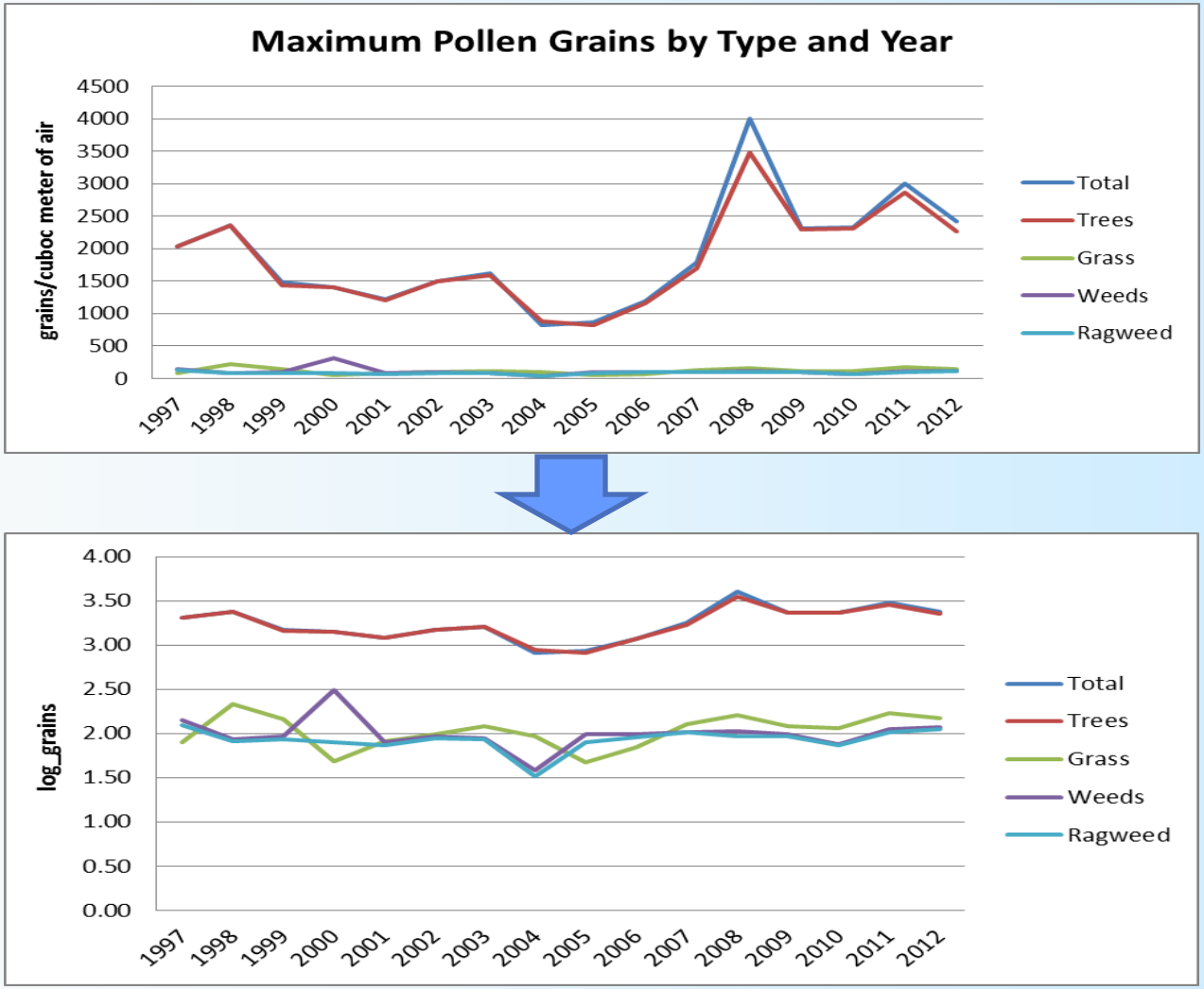


Mean (Log) Pollen Grains by Type and Year

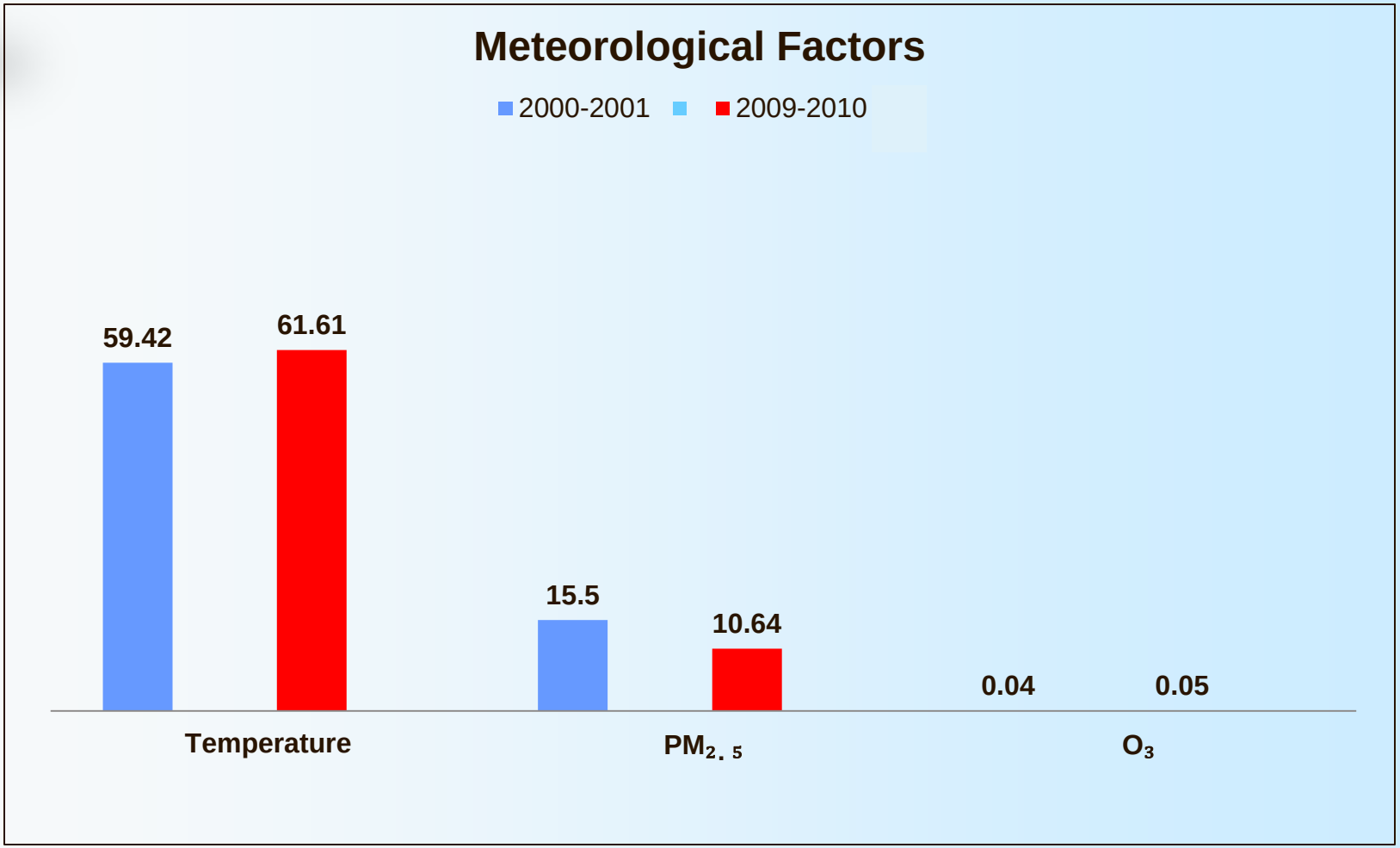




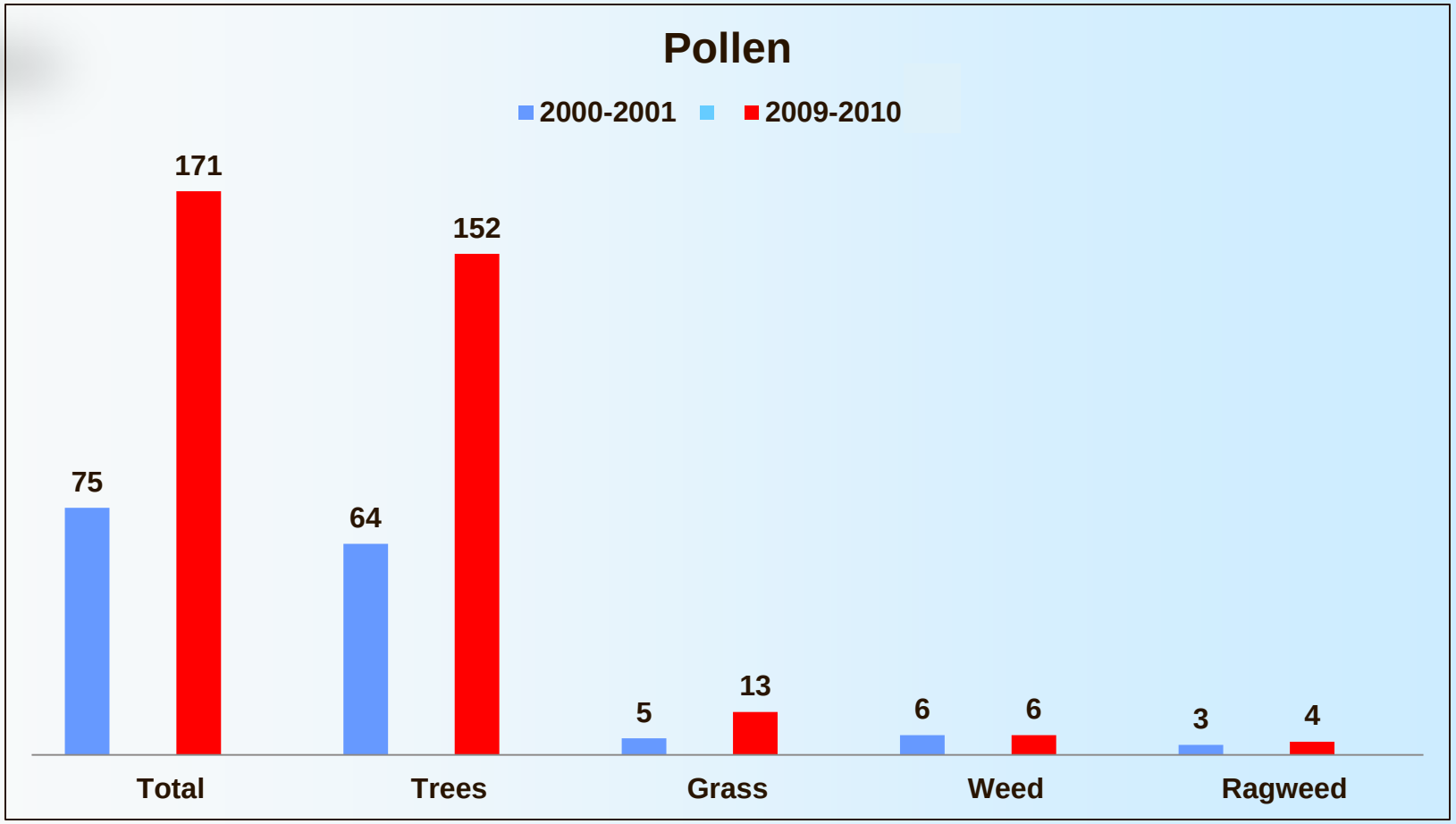
Maximum (Log) Pollen Grains by Type & Year



Climate Change Proxy Measures

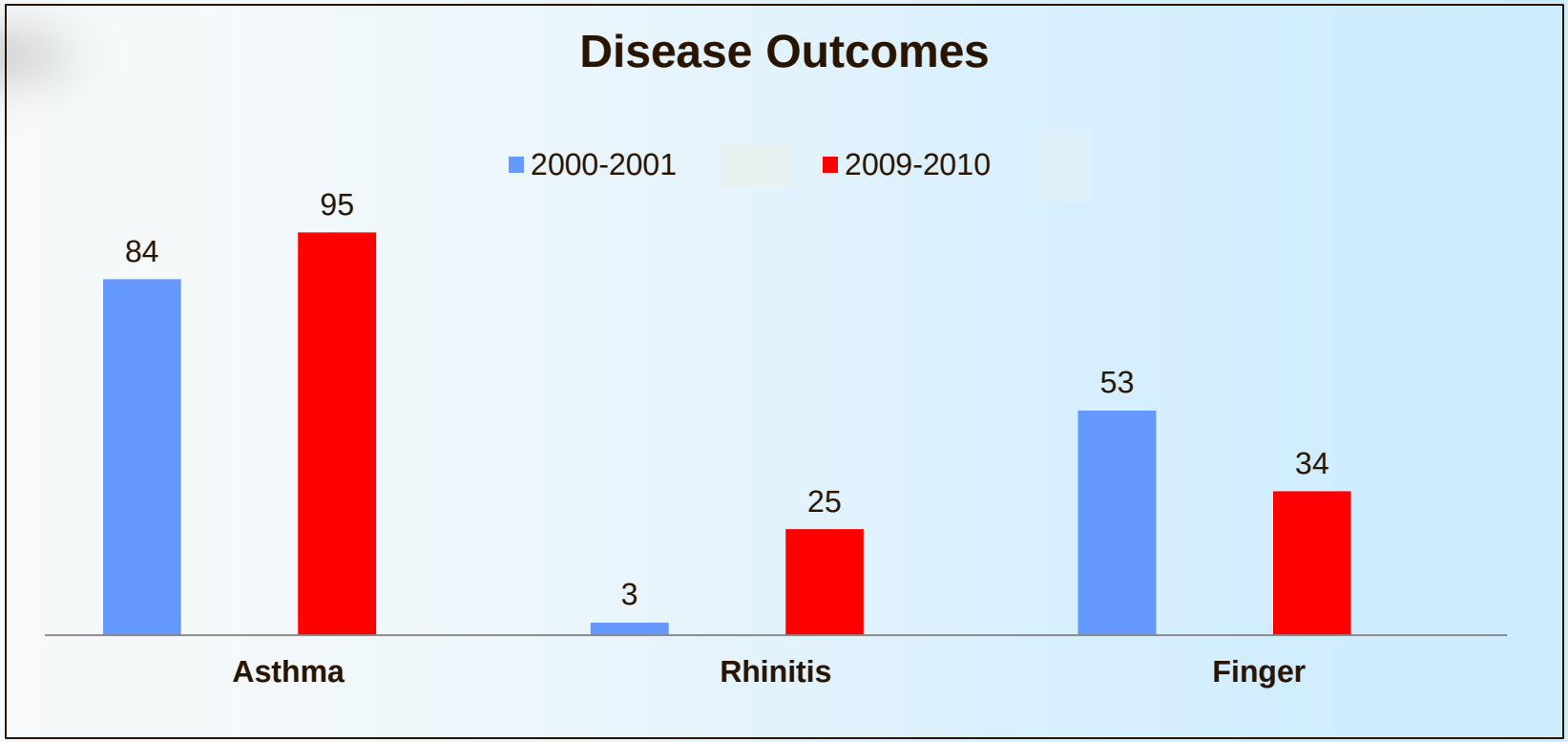


Climate Change Proxy Measures, Cont.



- All pollen types increased significantly between the two time periods.

Climate Change Proxy Measures, Cont.



- Average number of asthma and allergic rhinitis events significantly increased between the two time points, whereas average number of finger wound events decreased.

Correlation between. Pollen and Temperature with and without Controlling for $PM_{2.5}$ and O_3

		Correlation Coefficient			Partial
		Temperature	$PM_{2.5}$	O_3	Temperature
Pollen (Average)	Total	-0.10*	-0.37*	0.13*	-0.35*
	Tree	-0.14*	-0.37*	0.11*	-0.39*
	Grass	0.26*	-0.16*	0.29*	0.07*
	Weed	0.40*	-0.01	0.07*	0.57*
	Ragweed	0.29*	-0.16*	-0.08*	0.58*

* Significant at $p < 0.05$

- Temperature shows a positive correlation with grass, weed, and ragweed pollen, but a negative correlation with total pollen and tree pollen; this could be due to a seasonal effect.
- Temperature itself also shows positive correlation with grass, weed, and ragweed pollen after controlling effect modifiers fine PM and ozone.

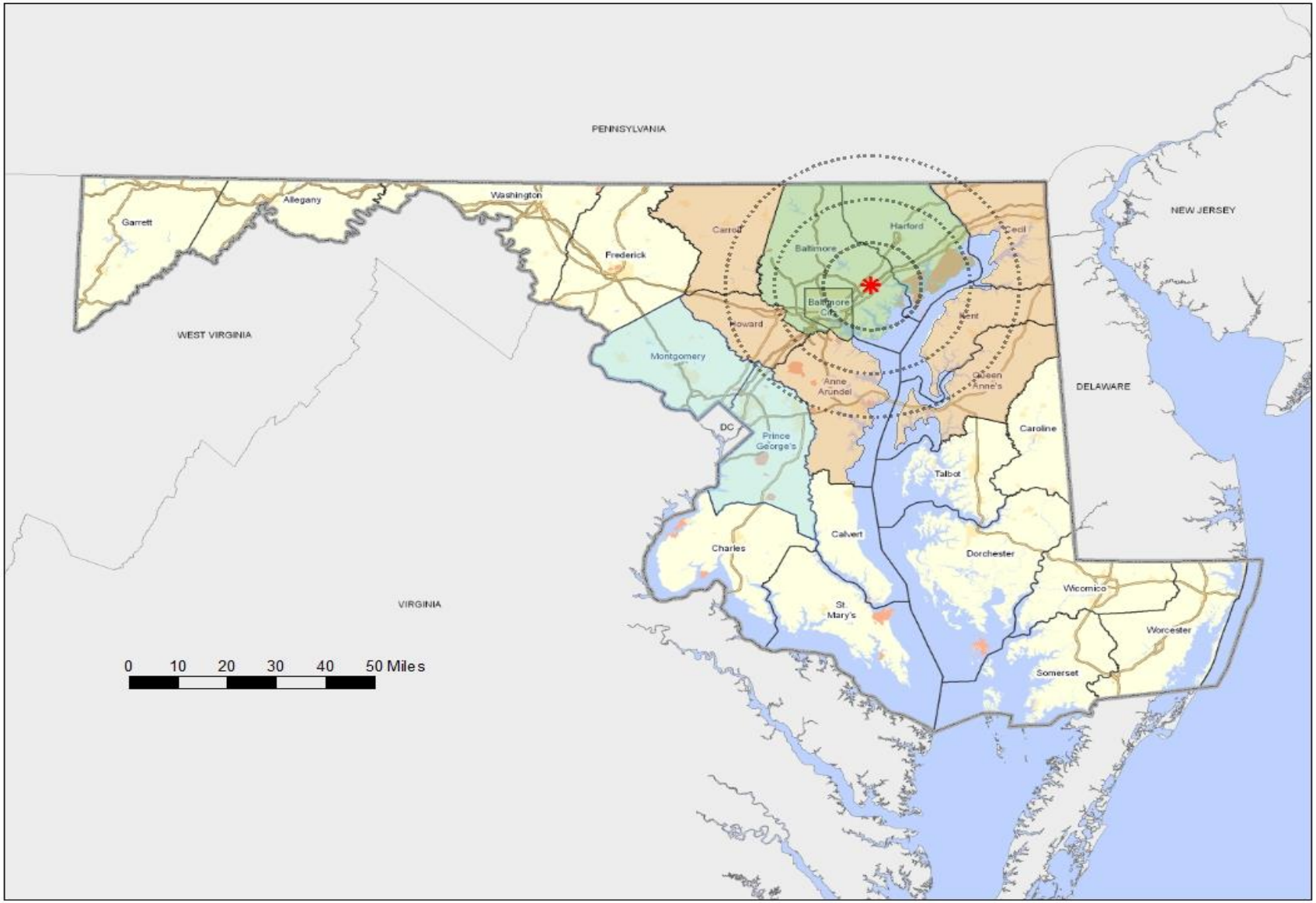
Change in Disease Outcomes

	Asthma			Allergic Rhinitis			Finger wounds		
Year	OR	95% CI		OR	95% CI		OR	95% CI	
2001	1.09	0.95	1.24	5.76*	4.15	7.99	0.86	0.81	0.92
2002	0.99	0.85	1.15	6.86*	5.01	9.38	0.83	0.78	0.90
2003	1.08	0.94	1.25	7.85*	5.78	10.65	0.86	0.80	0.92
2004	1.18*	1.02	1.37	11.04*	8.13	14.99	0.84	0.78	0.90
2005	1.20*	1.03	1.41	10.73*	7.87	14.64	0.80	0.74	0.87
2006	1.10	0.95	1.27	9.18*	6.77	12.45	0.74	0.69	0.80
2007	1.23*	1.06	1.42	9.33*	6.85	12.71	0.69	0.64	0.75
2008	1.06	0.90	1.24	8.17*	5.98	11.16	0.64	0.60	0.70
2009	1.09	0.94	1.28	9.41*	6.90	12.82	0.58	0.54	0.63
2010	1.20*	1.00	1.45	10.17*	7.32	14.11	0.53	0.49	0.59

* Significant at $p < 0.05$

- ORs for Asthma increased annually from year 2003 as compared to year 2000 (ref), especially it had increased significantly in year 2004, 2005, 2007, and 2010.
- ORs for Allergic rhinitis had increased significantly every year since year 2001 as compared to year 2000.

Maryland


PENNSYLVANIA
NEW JERSEY
WEST VIRGINIA
VIRGINIA
DELAWARE
Garrett
Allegany
Washington
Frederick
Carroll
Harford
Cecil
Baltimore
Baltimore City
Howard
Montgomery
Anne Arundel
Kent
Queen Anne's
DC
Prince George's
Caroline
Talbot
Calvert
Charles
Dorchester
St Mary's
Wicomico
Worcester
Somerset
0 10 20 30 40 50 Miles

Distance Effect

	Asthma			Rhinitis			Finger		
	OR	95% CI		OR	95% CI		OR	95% CI	
Distance 0-10	2.81*	2.66	2.97	1.74*	1.65	1.84	1.30*	1.26	1.35
Distance 11-20	1.22*	1.14	1.32	0.86*	0.80	0.92	1.28*	1.23	1.33

Unit: miles

* Significant at $p < 0.05$

- Asthma: OR for distance within 0-10 miles is 2.8 times greater than distance within 21-30 miles (ref), for distance within 11-20 miles is merely 22% greater than distance within 21-30 miles.
- Allergic rhinitis: OR for distance within 0-10 miles is 74% greater than distance within 21-30 miles, but OR for distance within 11-20 miles is 14% less than distance within 21-30 miles.

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